VOL. XXVII NEW YORK—THURSDAY, OCTOBER 10, 1912—CHICAGO No. 15

The AUTOMOBILE

FIAT Wins Grand Prize

Bragg Covers 410-Mile Course at 69.3 Miles Per Hour—Benz Second—Stutz Third—De Palma Badly Hurt in Last Lap

Upper—Caleb Bragg swinging his winning Fiat around the Graveyard turn on the Wauwatosa course in the thirty-sixth lap of the Grand Prix race at Milwaukee last Saturday. Lower—The finish of the Grand Prix—Bragg slowing up at the line to tell Starter Wagner of De Palma's accident

THE SUMMARY

Position	Driver	Car	M.P.H.
1	Bragg	Fiat	69.3
2	Bergdoll	Benz	65.6
3	Anderson	Stutz	65.2
4	Oldfield	Fiat	64.8

PREVIOUS GRAND PRIZE RACES

Place	Year	Miles	M.P.H.
Savannah	1908	402	65.111
Savannah	1910	415.2	70.55
Savannah	1911	411.36	74.47

MILWAUKEE, Oct. 6.—Fiat 41, driven by Caleb S. Bragg, won the 1912 Grand Prize race for the international trophy of the Automobile Club of America over the Wauwatosa course of 7.88 miles. The race was fifty-two laps of the course, or approximately 410 miles.

Benz 40, handled by Erwin Bergdoll, was a distant second, leading the Stutz entry across the line by a narrow margin. Oldfield's Fiat was a good fourth. The winning Fiat averaged 69.3 miles an hour.

The Fiat car driven by De Palma collided with the winner in the final spurt to the wire and was ditched when at least second place appeared certain for it.

It was a hair-raising race up to the time disaster met De Palma.

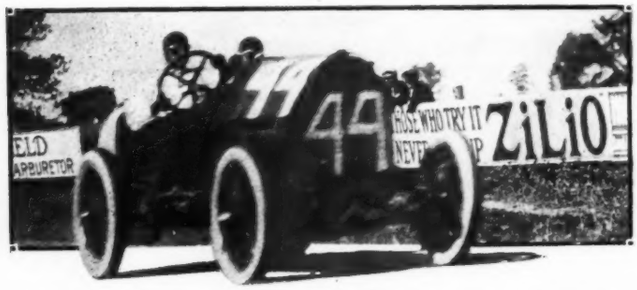
Cold type fails when it comes to describing the finish. The tables show that Bragg had 15 minutes 24 seconds over the second car, but they do not show how close Ralph De Palma, winner this year of the two big races at Elgin and the Vanderbilt Cup, came to snatching away from Bragg the international honors. Neither do they tell of how De Palma flirted with death and how lucky he was that his fate was not similar to that which robbed the motor world of Bruce-Brown. As a result of the daring attempt which he made to add to his laurel wreath, De Palma now is in the Trinity hospital in this city, suffering from abdominal injuries which will confine him to his bed for a week or more. On the final lap De Palma ran into Bragg from the rear, his Mercedes turned over, throwing out both driver and mechanician.

With De Palma eliminated in this sensational manner, Bergdoll in the Benz ran into second place after a hot finish with Anderson in the Stutz, whom he beat by 31 seconds for the position, while Barney Oldfield in a Fiat was fourth, 4 minutes

RACE OF 409 MILES AND 4616 FEET (FIFTY-TWO LAPS OF THE COURSE) FOR

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04	9 70.92	10 78.80	11 86.68
41	FIAT	Bragg	Elapsed Time	6:34	12:50	19:04	25:14	31:31	37:56	44:27	50:53	57:60	63:39	70:01
			Lap Time	6:34	6:16	7:04	6:10	6:17	6:25	6:31	6:26	7:07	6:39	6:22
40	BENZ	Bergdoll	Elapsed Time	6:38	13:08	19:33	25:53	32:16	38:40	49:38	57:18	64:06	70:42	77:20
			Lap Time	6:38	6:30	6:25	6:20	7:23	6:24	11:58	8:40	7:48	6:36	7:38
43	STUTZ	Anderson	Elapsed Time	7:14	14:11	21:10	28:05	35:03	42:09	49:01	55:59	62:54	69:35	76:52
			Lap Time	7:14	6:57	6:59	6:55	6:58	7:06	6:52	6:58	6:55	6:41	7:17
44	FIAT	Oldfield	Elapsed Time	8:14	15:02	21:49	28:46	36:04	45:06	52:08	58:50	65:31	72:13	78:53
			Lap Time	8:14	6:48	6:47	6:57	7:18	7:02	7:02	6:42	6:41	6:42	6:40
35	MERCEDES	De Palma	Elapsed Time	6:42	13:20	19:57	26:33	33:05	39:40	46:13	52:50	59:32	66:07	72:50
			Lap Time	6:42	6:38	6:37	6:36	6:32	6:35	6:33	6:47	6:42	6:35	6:43
39	MERCEDES	Clark	Elapsed Time	7:30	14:53	22:08	29:28	36:48	44:09	51:32	58:47	66:03	73:15	80:27
			Lap Time	7:30	7:23	7:05	7:20	7:20	7:21	7:23	7:15	7:16	7:12	7:12
42	BENZ	Horan & Burman	Elapsed Time	7:09	14:04	21:01	27:48	35:40	42:40	50:00	57:35	64:27	71:33	78:31
			Lap Time	7:09	6:55	6:57	6:47	7:52	7:00	7:20	7:35	7:52	7:06	6:58
33	FIAT	Tetzlaff	Elapsed Time	6:20	12:37	18:50	25:02	31:17	37:36	43:59	50:38	56:55	63:09	71:08
			Lap Time	6:20	6:17	6:13	6:12	6:15	6:19	6:23	6:09	6:17	6:14	7:59
32	LOZIER	Louis Fountain	Elapsed Time	7:25	14:32	21:36	28:35	35:35	42:37	49:33	56:28	63:49	70:43	77:42
			Lap Time	7:25	7:07	7:04	6:59	7:00	7:02	6:56	6:55	7:21	6:54	6:59
34	MERCER	Hughes	Elapsed Time	7:02	13:48	24:50	40:48	48:28	55:10	61:57	68:46	75:37	82:21	88:59
			Lap Time	7:02	6:46	11:02	15:58	7:40	6:42	6:47	6:49	6:51	6:44	6:38
36	MERCEDES	Wishart	Elapsed Time	6:40	13:02	19:28								
			Lap Time	6:40	6:20	6:26	Out—Broken shaft							
31	BENZ	Burman	Elapsed Time	6:58	13:50									
			Lap Time	6:58	6:42	Out—Broken piston								

No.	CAR	DRIVER	Lap Miles	28 221.64	29 228.52	30 236.40	31 244.28	32 252.16	33 260.04	34 267.92	35 275.80	36 283.68	37 291.56	38 299.54
41	FIAT	Bragg	Elapsed Time	187:21	194:00	200:34	207:04	213:40	220:17	227:02	233:32	240:02	251:38	258:23
			Lap Time	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45
40	BENZ	Bergdoll	Elapsed Time	200:26	208:29	215:12	221:57	228:38	235:13	241:58	248:40	255:20	265:01	273:22
			Lap Time	7:04	8:03	6:43	6:45	7:21	6:41	6:45	6:42	6:40	9:41	8:21
43	STUTZ	Anderson	Elapsed Time	201:40	208:56	216:04	223:11	230:19	237:23	244:28	251:35	258:41	265:49	272:56
			Lap Time	10:30	7:16	7:08	7:07	7:08	7:04	7:05	7:07	7:06	7:08	7:07
44	FIAT	Oldfield	Elapsed Time	203:42	210:52	219:29	226:44	233:33	243:39	250:37	257:36	264:34	277:40	284:13
			Lap Time	7:15	7:16	8:37	7:15	6:49	10:06	6:18	6:59	6:58	13:06	6:33
35	MERCEDES	De Palma	Elapsed Time	196:37	203:08	209:39	216:11	222:43	229:13	235:38	242:04	250:25	259:36	263:12
			Lap Time	6:45	6:31	7:31	6:32	6:32	6:30	6:25	6:36	8:21	9:11	13:36
39	MERCEDES	Clark	Elapsed Time	210:50	218:17	225:45	233:12	240:29	247:53	255:23	263:53	281:58	292:02	299:29
			Lap Time	7:19	7:27	7:28	7:27	7:17	7:24	9:30	8:30	8:05	10:04	7:27
42	BENZ	Horan & Burman	Elapsed Time	218:43	225:34	232:48	252:54	259:57	267:05	274:22	281:37	291:56	298:34	305:09
			Lap Time	6:48	6:53	7:12	20:06	7:03	7:08	7:13	7:15	10:19	6:38	6:35
33	FIAT	Tetzlaff	Elapsed Time	184:13	190:53	197:33								
			Lap Time	8:31	6:40	6:40	Out—Broken radius rod							
32	LOZIER	Louis Fountain	Elapsed Time											
			Lap Time	Out—Sprung steering knuckle										
34	MERCER	Hughes	Elapsed Time											
			Lap Time	Out—Broken gasoline line										
36	MERCEDES	Wishart	Elapsed Time											
			Lap Time	Out—Broken shaft										
31	BENZ	Burman	Elapsed Time											
			Lap Time	Out—Broken piston										



Oldfield's Fiat, which won fourth place, nearing grandstand

32 seconds back of Anderson. Clark in a Mercedes and Burman driving Horan's Benz were still running when the race was called off because of the crowd refusing to be held in check any longer. Twelve cars in all started in the race, but half of them were eliminated for one reason or another.

But it was the Bragg-De Palma struggle that stirred the crowd of 150,000 to a frenzy, and the accident at the eleventh hour undoubtedly robbed the motoring public of the greatest finish that ever had been put up in a grand prix race. Bragg always had been a factor in the race, never being worse than third and having led the field from the thirty-first lap when Tetzlaff went to the side lines for keeps. De Palma had been plugging along grimly, fifth and sixth at the start, then going up to third, then second and finally leading in the twenty-second, twenty-third and twenty-fourth laps, then dropping to third for four laps when Tetzlaff and Bragg were battling, and finally becoming runner-up to Bragg when Tetzlaff went out. It was a plucky battle that De Palma put up, for while Bragg had all the earmarks of a winner, the Italian never relinquished his efforts to catch him.

With four laps to go, De Palma was 4 minutes 19 seconds to the bad. He made a lap in 6:28 to Bragg's 7:21 and cut the margin to 3 minutes 26 seconds. The fiftieth lap was made in 6:36 by De Palma and 7:26 by Bragg and the gap was reduced to 2 minutes 36 seconds, when Starter Wagner waved his green flag for both of them. De Palma was chasing his rival with deadly intensity, and upon reciving a signal from his pit to "beat it" he stepped on the throttle and had the accelerator fiat with the boards when he swung into the North Fond Du Lac road. He rushed up on the Fiat with great leaps and bounds and at station 11 he caught his rival. But it was necessary for him to do more than catch him—he had to pass him and beat him to the tape by the margin that Bragg had over him at the start, De Palma being 35 and Bragg 41.

Then came the thriller that spoiled the finish. There are conflicting stories as to just how this occurred. De Palma was trying to pass, and some say that just as he crept up to the rear wheel of the Fiat, Bragg swung over a trifle and the gray Mercedes ran into the rear of the red car. The Mercedes turned turtle and both De Palma and his mechanic, Tom Alley, were hurled to the roadside. The collision failed to disturb Bragg, who continued on his way, a certain winner now.

At the grandstand the 10,000 occupants of the seats were awaiting the finish and there was a dead silence when Bragg drove up slowly, came to a stop at the tape and whispered to Starter Wagner, telling him of the accident.

THE GRAND PRIX GOLD CUP RUN AT MILWAUKEE, WIS., ON SATURDAY, OCTOBER 5

11 86.68	12 94.56	13 102.44	14 110.32	15 118.20	16 126.08	17 133.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	23 181.24	24 189.12	25 197.00	26 204.88	27 212.76
70:01	76:32	83:06	89:41	96:24	102:56	109:42	116:15	122:44	129:24	140:39	141:22	153:57	160:38	161:28	114:00	180:41
6:22	6:31	6:34	6:41	6:37	6:32	6:46	6:33	6:29	6:30	11:15	6:43	6:35	6:41	6:10	6:32	6:41
77:20	83:58	90:39	99:42	106:17	112:55	119:34	126:16	132:59	139:37	146:21	153:01	159:41	166:36	173:26	182:43	193:22
7:38	6:38	7:41	9:03	7:35	6:38	6:39	6:42	6:43	6:38	6:44	6:40	6:40	7:15	6:50	8:37	10:39
76:52	83:49	90:44	97:45	104:54	111:56	118:53	126:54	133:04	140:08	147:13	154:27	161:50	169:04	176:22	183:33	191:10
7:17	6:57	6:55	7:01	7:09	7:02	6:57	8:01	6:10	7:04	7:05	12:37	7:23	7:14	7:18	7:11	7:37
78:53	85:32	92:16	99:01	105:53	112:39	119:38	126:25	133:18	140:21	147:23	154:21	167:28	174:42	181:47	188:56	196:27
6:40	6:39	6:44	6:45	6:52	6:46	6:59	6:37	6:57	7:03	7:02	0:58	17:07	7:14	7:05	7:09	7:31
72:50	79:30	86:12	92:46	99:18	105:48	112:19	118:52	125:20	131:49	138:23	144:55	151:22	157:55	167:20	177:48	189:52
6:43	6:40	6:42	6:34	6:32	6:30	6:31	6:33	6:26	6:29	6:74	6:32	6:27	6:33	8:35	10:28	12:04
80:27	87:43	95:01	102:20	109:42	117:18	124:41	132:06	139:31	146:55	154:21	161:54	169:32	177:11	188:23	195:55	203:30
7:12	7:16	7:18	7:19	7:22	7:36	7:33	8:68	7:25	7:24	7:26	7:33	7:38	7:39	11:12	7:32	7:36
78:31	85:27	92:20	108:59	119:38	127:34	134:45	145:26	154:54	162:07	169:25	176:49	183:53	191:04	198:16	205:04	211:55
6:58	6:56	6:53	6:39	10:49	7:56	11:11	10:41	9:28	7:13	7:18	7:24	7:04	7:11	7:12	6:58	6:51
71:08	77:33	83:48	89:55	96:06	102:17	111:20	117:54	124:10	130:41	138:38	145:00	151:39	158:07	164:39	171:12	177:42
7:59	6:25	6:15	6:07	6:11	6:11	9:03	6:34	6:16	6:31	7:07	6:22	6:39	6:28	6:32	6:33	6:30
77:42	84:39	91:35	98:37	105:34	112:35	119:36	126:34	133:34	146:32	206:28						
6:59	6:57	6:56	7:02	6:57	7:01	7:01	6:48	7:00	12:58	9:56	Out—Sprung steering knuckle					
88:59	95:46	102:30	109:18	122:17	129:21											
6:38	6:47	6:44	6:48	12:59	7:14	Out—Broken gasoline line										

38 299.54	39 307.40	40 315.29	41 323.17	42 331.04	43 338.93	44 346.82	45 354.7	46 362.58	47 370.47	48 378.35	49 381.23	50 394.11	51 401.99	52 409.88	Position	Miles per Hr.
258:23	265:07	272:01	279:02	286:05	293:11	300:42	307:53	315:16	322:33	329:54	337:17	344:38	352:04	359:27.44	1	69.3
6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:21	7:23	7:21	7:27	7:23		
273:22	280:11	283:09	294:14	301:25	308:37	316:06	326:36	333:32	340:39	347:37	354:31	361:14	368:00	374:58.38	2	65.6
8:21	6:49	6:58	7:05	7:11	7:12	7:29	10:20	7:06	7:07	6:58	6:54	6:43	6:46	6:58		
272:56	280:08	287:27	294:55	301:42	308:53	316:05	323:15	330:21	337:32	344:43	351:55	359:22	367:51	375:22.47	3	65.2
7:07	7:12	7:19	7:28	6:47	8:11	10:12	7:10	7:06	7:11	7:11	7:12	7:27	8:29	7:31		
284:13	291:24	298:16	304:55	311:45	318:39	325:39	332:18	338:54	345:24	351:58	358:52	365:45	372:49	379:54.69	4	64.8
6:33	7:11	6:52	6:39	6:50	6:54	7:00	6:39	6:36	16:30	6:34	6:54	6:53	7:04	7:05		
263:12	273:21	280:05	286:40	293:11	299:54	307:56	314:54	321:40	328:18	335:05	341:36	348:04	354:40			
13:36	10:09	6:34	6:35	6:31	6:43	8:02	6:58	6:46	6:38	6:47	6:31	6:28	14:38	Out—Accident		
299:29	307:01	314:30	322:03	329:33	337:03	344:35	352:02	359:25	367:17	375:01	382:45	391:04				
7:27	7:32	7:29	7:33	7:30	7:36	7:32	7:27	7:23	7:52	7:54	7:44	8:21	Running			
305:09	313:34	320:19	327:02	334:02	341:10	359:31	368:33	379:08	380:09							
6:35	8:25	6:54	6:43	7:00	7:08	8:21	9:03	10:35	9:01	Running at Finish						

De Palma was not the only formidable rival Bragg had to dispose of. Tetzlaff as usual was a factor as long as he was running, just as he was in the Vanderbilt. Had his car stood up it is more than likely he, instead of Bragg, would have been the winner of the race. From the start the native son was aggressive, leading for the first nine laps, then dropping to second for five rounds, leading for two, second for four, leading for one, second for three and then going into the lead, staying there for six laps, when he went out in the thirty-first because of a broken radius rod. At that time he was 3 minutes ahead of Bragg and up to that time he had averaged 71.5 miles per hour. Tetzlaff made the fastest lap of the race—6:07 in the fourteenth, an average of 77.2 miles per hour.

From start to finish none of the other nine contestants had a look-in for first place.

Bob Burman in the Benz went out in the third lap with a broken piston, but later on relieved Horan, his team mate, and was running at the end. Wishart in a Mercedes lasted into the fifth lap when a broken driving shaft retired him; Hughes in the Mercer quit in the seventeenth, giving a broken gasoline line as his excuse for docking his car; Fontaine, who took Nelson's seat in the Lozier, sprung a steering knuckle when he hit the straw pile on the city limits turn and he quit on the twenty-first lap; Tetzlaff went out in the thirty-first and De Palma on the fifty-second.

Standing out as a sterling performance was the work of the Stutz, driven by Gil Anderson, which was the only American car to finish. Mulford scratched his Knox because he could not get it into shape for such a gruelling grind, while both the Lozier, which was a private entry not backed by the factory, and the Mercer failed to finish. The Stutz ran consistently at all times, being in third place from the forty-fourth lap on and being beaten only 31 seconds by the big Benz driven by Bergdoll. At that it was the closest finish of the race. The Stutz averaged 65.5 miles per hour and had no mechanical trouble whatsoever, changing one tire and breaking a shock-absorber.

It rained Thursday and spoiled the small-car events, which were run, however, with only about 500 people looking on. Both the contests were made farcical by withdrawals and mishaps. In the Pabst trophy race for the 231-300 cars only two cars finished, Roberts' Mason and Hastings' Falcar, while in the Wisconsin cup Harry Endicott in a Mason was the winner with young Mason in a stripped Mason touring car second.

The Milwaukeeans now are figuring up how much it cost them to run the meet, but the outlook is much brighter than

Clark's Mercedes was still running when the race was called off

Bragg, Fiat, overhauling Bergdoll, Benz, on a sharp turn in the Grand Prix race on Saturday

anticipated. Because of the huge crowds of yesterday it is likely that Milwaukee will almost come out even, although it cost $70,000 to finance the meet, of which sum something like $28,000 was spent on the road. Undoubtedly Milwaukee would have been a big winner had it not been for its inability to collect from all those who witnessed the running of the grand prix. George Brown, one of the promoters, acknowledges now that a mistake was made in not giving property owners a percentage of the receipts as is done at Elgin. Not being financially interested, the farmers did not try to keep the crowds from getting in free. Indeed, it is related that at one of the farms the owner, armed with a shotgun, deliberately let the people onto his property at 25 cents per head and when the promoters tried to stop him he threatened to fire on them. Then again it seemed impossible to stop grafting.

Milwaukee is keen for next year's Vanderbilt and grand prix and has started negotiations to get the plums. The Badgers point out that before the next meet they will have an entirely concrete course and one that is much wider than at present. Two of the townships through which the circuit runs already have let contracts for concreting the road, while the association itself will pay for having the rest of the course fixed in a similar manner. This will require the dealers to rebuild about 4 miles of the course, but when it is done it is thought the circuit will be superior even to Santa Monica.

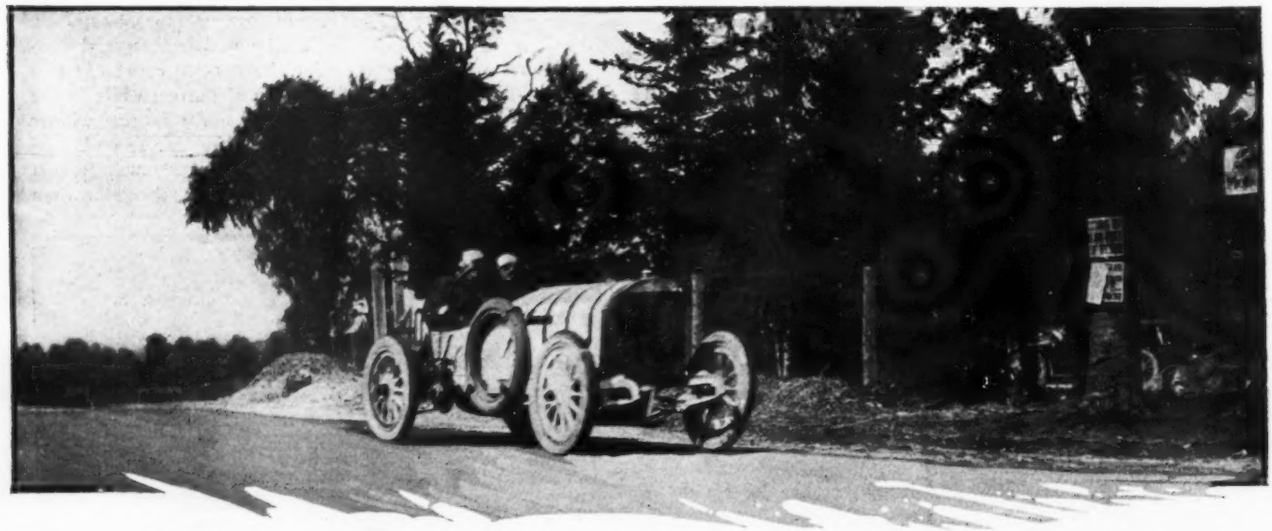
Reports from the Trinity hospital today are to the effect that De Palma passed a good night. The doctors so far have failed to find the fracture of the leg that first was reported and say that the chief injury is a punctured abdomen which is not at all terrifying. An operation was performed and it is expected that De Palma will be convalescent in a week or so. The mechanic, Alley, suffered a broken collar bone from which he will recover.

Very Little Tire Trouble

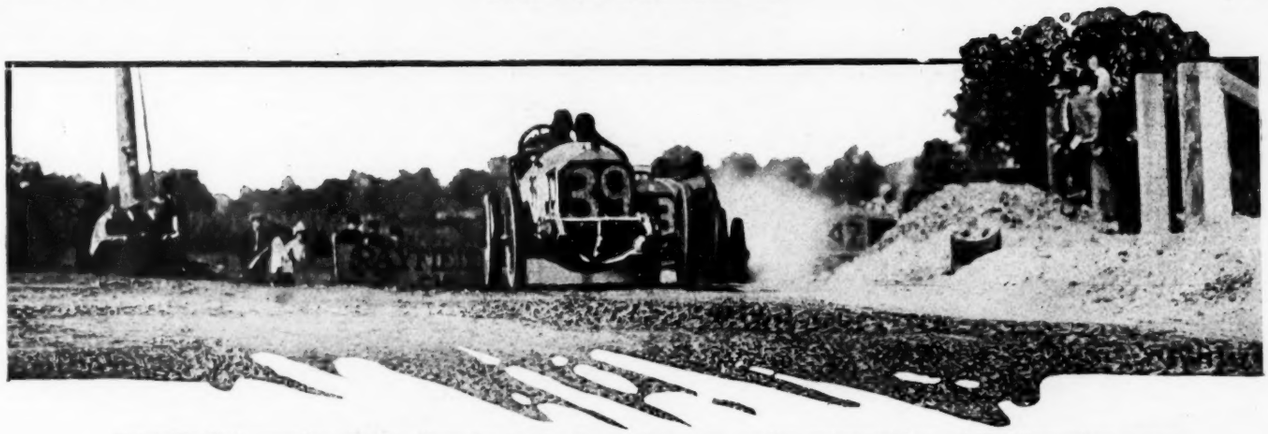
IN few of the big road races have there been so many different makes of tires represented as in the Milwaukee grand prix, and seldom has so long a contest been run with so little tire trouble. Michelin, Firestone, Miller, Goodyear and Fisk were represented in the grind. Bragg, De Palma, Fontaine, Wishart and Clark rode Michelins; Oldfield, Horan and Hughes wore Firestones; Tetzlaff had the Miller; Bergdoll the Fisk, and Anderson the Goodyear. Only twenty-four cases of tire trouble were reported.

"My count shows that Clark in the Mercedes went through without a change," says R. B. Tracey, manager of the Chicago Michelin branch. Wishart did not have any trouble, either, nor did Burman, but neither went very far. Bragg changed three shoes, De Palma two, Anderson one, Bergdoll eight, Fontaine one, Hughes one, Horan two and Oldfield three.

"Bragg used steel-shod tires all around, while De Palma had them only on the rear. The latter used the buffed tires in the Vanderbilt such as we made up for the 500-mile race at Indianapolis, and he had nine cases of trouble. For the grand prix I got him to use steel-shod tires on the rear and advocated them all around, but he wouldn't put them on in front. One of his changes was made on the road and the other, a front, at the pits. In the latter change he used only 28 seconds in switching. The tire Bragg changed in the pit was changed only as a precaution, for he really did not need a new casing. He was taking on gasoline and oil and improved the opportunity to also change the tire. The other change was made on the road. Passing the stand, the steel-studded strip on his left rear came off and he stopped in the back stretch to switch."



Erwin Bergdoll, who took second place, in his big Benz, rounding the Graveyard turn on the forty-sixth lap



Tetzlaff's Fiat crowding Clark's Mercedes in the Grand Prix race on the graveyard turn of the Wauwatosa course

Work Done at the Pits

ANNUAL grand prix races are unique from the standpoint of the observer of work at the pits, as they are international, while the others are national events. They are run therefore under the rules of the Automobile Club of America instead of the A. A. A., which governs the national contests. The A. C. A. rules do not permit the pit men to render any assistance to the contestants. That is, the driver and his mechanic must do all the work that becomes necessary about the car during the race. They must make all tire changes and fill oil, water and fuel tanks as well as make the actual mechanical adjustments. In the national races, pit attendants are permitted to change tires and replenish the supplies.

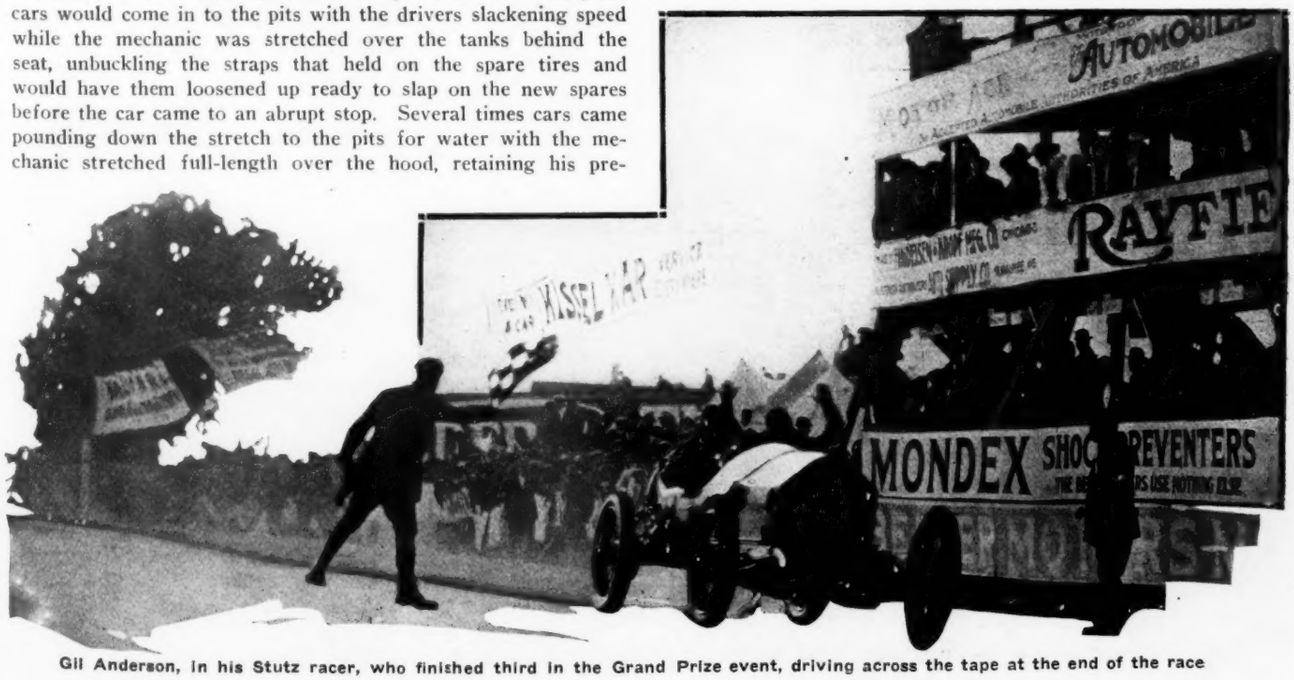
The fact that the drivers and mechanics were forced to do all the work about the car resulted in the stops at the pits requiring more time than is usual and probably cut down the average speed of the race quite materially. On the whole, however, the cars got away from the pits in shorter time than was to be expected under the circumstances, for the contestants worked like demons to cut down the time of the enforced stops. The grandstands had a chance to see the teamwork of expert racing drivers and mechanics.

When it was necessary to take on another spare tire to replace one that had been used at some other point on the course, the cars would come in to the pits with the drivers slackening speed while the mechanic was stretched over the tanks behind the seat, unbuckling the straps that held on the spare tires and would have them loosened up ready to slap on the new spares before the car came to an abrupt stop. Several times cars came pounding down the stretch to the pits for water with the mechanic stretched full-length over the hood, retaining his precarious position with one hand on the hood strap while with the other he removed the radiator cap in order to save as many precious seconds as possible.

The necessity for quick work at the pits resulted in several interesting arrangements for filling the fuel tanks. Bragg had the gasoline stored at his pit under pressure with a hose from the storage tank which was slipped into the fuel tank of his Fiat. Some of the others had small gasoline cans which could be up-ended into the tank without requiring a funnel. Two of the cars, the Stutz and Hughes' Mercer, were equipped with wire wheels in the hope of cutting down the number of tire changes and the time required to make them. Nor was any time lost in stopping and getting under way again, for the mechanic usually had leaped to the track before the car had come to a stop and nearly always had to make a flying leap to regain his seat after the driver had started.

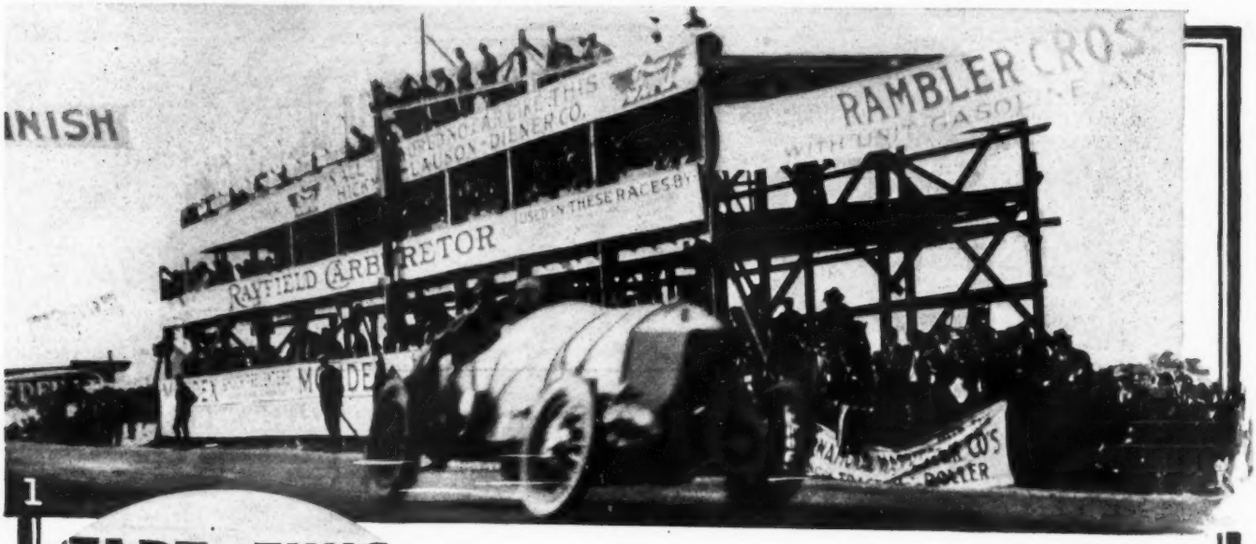
Pit stops on the whole were fewer than were to be expected in a race of 410 miles at the speed maintained Saturday. There were in all thirty-eight, three of which were permanent, the cars withdrawing from the race, and can hardly be counted. Of the thirty-five temporary halts, only six were for tire replacements alone, although in twenty of them advantage of the enforced stop for other causes was taken to replace worn tires or spares, or other things were done when tire changes became necessary. As might be expected, the majority of the tire

(Continued on page 745)



Gil Anderson, in his Stutz racer, who finished third in the Grand Prize event, driving across the tape at the end of the race

Vanderbilt Cup



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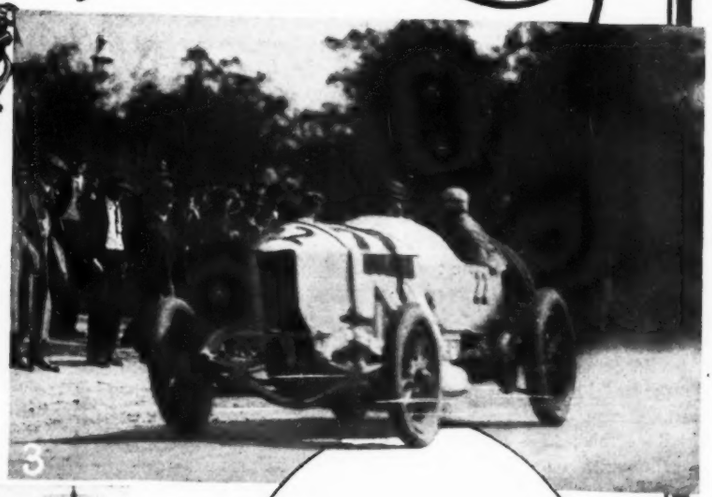
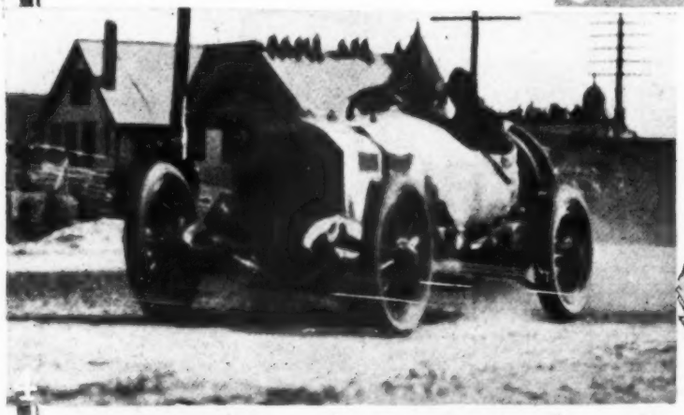


3

1—De Palma in Mercedes, the winner, passing official stand at the beginning of the last lap

2—Cars lined up for start of Vanderbilt Cup race, October 2. Eight cars started and five finished the 300 miles.

3—De Palma's Mercedes traveling at full speed on the backstretch



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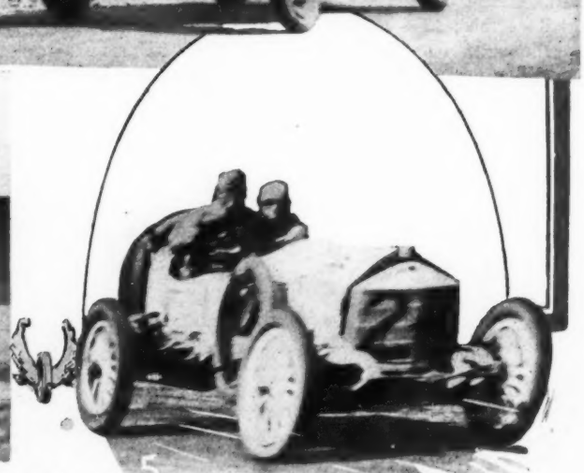
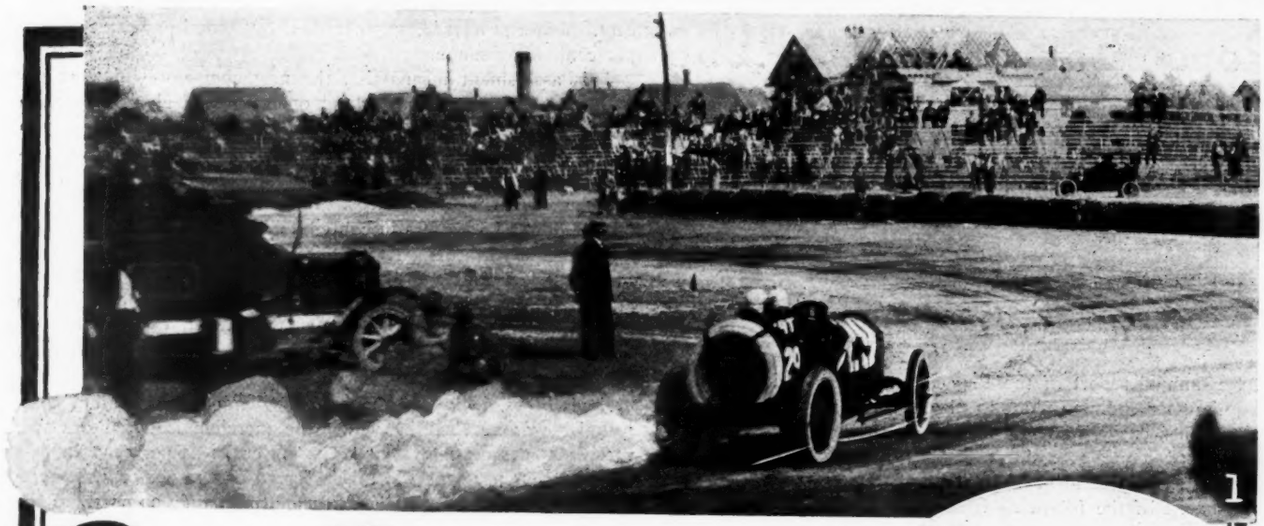


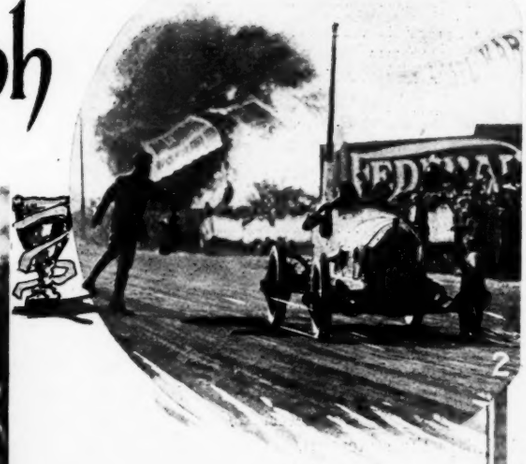
5

4—The Clark Mercedes finished fifth at 61.6 miles per hour. It is here shown on the home stretch

5—Ralph Mulford's Knox which was eliminated in the third lap



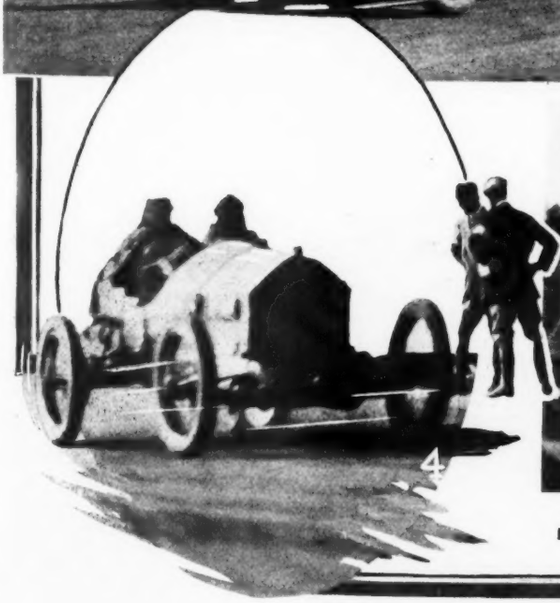
Race by Photograph



1—Tetzlaff in Fiat on hairpin turn. Tetzlaff set the pace of the race until eliminated in lap 28

2—Hughes in Mercer Special, winning second place, less than a minute behind De Palma. His speed was 68.8 miles per hour

3—Wishart in Mercedes on backstretch. He won third place at a speed of 64.9 miles per hour



4—Anderson in his Stutz winning fourth place at 64.2 miles per hour

5—Nelson in Lozier, who made twenty-six laps of the course

Pope Earnings $251,290

Gross Receipts During Fiscal Year Amounted to $3,734,112—New Truck Is Success

Final Plan of Reorganization Adopted By U. S. Motors—New Securities to Replace Old Stocks

THE annual report of the Pope Manufacturing Company for the year ending July 31 has been issued. It shows that the company has enjoyed net earnings during the past year amounting to $251,290 on a gross business of $3,734,112.

According to President Pope's report, the assets of the company consist of the following items:

Real estate, patents, good will, etc	$5,781,293
Construction	36,276
Additions, adjustments and installation	243,681
Cash items prepaid	534,177
Inventories	1,477,312
Good accounts	396,608
Cash and cash items	253,829
Total	$8,723,176
Less deductions for reserves, replacements, etc	440,998
	$8,282,178
The liabilities are as follows:	
Capital stock issued	$5,989,000
Two-year 6 per cent. gold bonds	1,000,000
Accounts payable, payrolls, deposits, etc	260,098
Contingent liability	20,159
Surplus, 1911	936,430
Net earnings, 1912	251,293
Total	$8,457,070
Less dividends	174,892
	$8,282,178

The surplus of the company stands over $1,000,000 after writing off $440,000 for reserves and for future replacements, scrapping of machinery and deterioration. No doubtful accounts are included in the statement.

The company paid 6 per cent. on its preferred stock and made one payment of 1 per cent. on the common.

President Pope says that the plants have been kept in the most efficient condition and the cost of up-keep charged to operations. The inventory was made at actual cost and the item of accounts payable covers invoices that had not matured on July 31. All bills have been discounted.

The truck has met with success, according to the report and a 5-ton model will be added to the present output of 3-ton commercial vehicles.

U. S. Motors Plan Settled

The plan of reorganization of the United States Motor Company has been settled.

All the existing securities of the company amounting to about $11,500,000 of preferred, $12,200,000 common and $6,000,000 debentures will be wiped out and new securities will be issued in their places. In addition, $13,000 of the preferred stock of the Columbia Motor Car Company and $118,000 of the common will be subjected to the same treatment.

The basis of the new issue will be an assessment of $24 a share on the common and preferred stocks of the United States Motor Company and the Columbia company as outlined. The total capitalization will be scaled down as follows:

For and in consideration of the payment of $24 a share, the new company will issue in exchange for the preferred certificates, 24 per cent. of new first preferred, 25 per cent. of second preferred and 30 per cent. of common.

For the common certificates outstanding on payment of the assessment of $24 a share, the new company will issue 24 per cent. of first preferred, 17.5 per cent. of second preferred and 30 per cent. of common.

This assessment means that the new company will start out with a clear capital for working operations of about $3,000,000.

It is proposed to raise by this method the sum of $5,720,000. The remainder will be used for funding the matured obligations.

At this time there is still remaining in the treasury of the company the sum of $1,000,000. The disposition of this fund was one of the chief matters in contention in the deliberations of the merchandise creditors. At first it was proposed that the creditors of the various companies that had supplied parts, materials, etc., should not receive any cash allotment. Then the proportion offered was raised to 10 per cent. Neither of these early proposals was considered as equitable by the creditors and a counter demand was made for 30 per cent. This was refused by the general creditors, including the banking claim-holders and a compromise was reached by which the merchandise creditors will receive 25 per cent. of their claims in cash; 25 per cent. in first preferred, 25 per cent. second preferred and 15 per cent. in common, thus making a settlement of approximately 90 cents on the dollar.

The return day of the suit filed in the United States District Court has been fixed as October 28 and it is considered likely that the plan will be approved as presented and the embarrassment of the company relieved at that time.

To Build Knight Motors for Trade

The F. B. Stearns Company, Cleveland, O., has announced that it is prepared to manufacture Knight type sleeve valve motors for the trade.

When the Knight licenses were first granted to American manufacturers, the Atlas Engine Works, of Indianapolis, succeeded in securing one of them, the understanding being that they were to build motors for automobile manufacturers. As soon as this

Automobile Securities Quotations

Automobile and accessory securities were dull and featureless in the markets as a general thing throughout the past week. The one spot that had some appearance of life was International Motors common which broke sharply at the same time that the dividend was paid on the preferred shares. The volume of selling was not large but the market was not well supported and was marked down rapidly under small offerings.

	1911 Bid	1911 Asked	1912 Bid	1912 Asked
Ajax-Grieb Rubber Co., com	..	..	150	175
Ajax-Grieb Rubber Co., pfd	..	..	90	98
Aluminum Castings, pfd	..	..	100	102
American Locomotive, com	34½	35	43¾	44
American Locomotive, pfd	105	105½	107	108½
Chalmers Motor Company	..	..	145	155
Consolidated R. T. Co., com	6	10	13	15
Consolidated R. T. Co., pfd	10	20	50	60
Firestone Tire & Rubber com	175	180	270	275
Firestone Tire & Rubber, pfd	106½	108	107	109
Garford Company, preferred	..	..	99	100
General Motors Company, com	38	40	36¾	37½
General Motors Company, pfd	76	79	80	81½
B. F. Goodrich Company, com	*238	*242	†74½	†75
B. F. Goodrich Company, pfd	*118	*119	†106	†106¾
Goodyear Tire & Rubber, com	225	230	336	340
Goodyear Tire & Rubber, pfd	105	107	104	105
Hayes Manufacturing Company	..	..	..	92
International Motor Co., com	..	..	19	21
International Motor Co., pfd	..	..	78	81
Lozier Motor Company	..	..	43	50
Miller Rubber Company	..	..	..	140
Packard Motor Company, pfd	104	106	105½	107
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	55	60	37	38
Pope Manufacturing Co., pfd	73	75	73	75
Reo Motor Truck Company	8	10	9½	10½
Reo Motor Car Company	23	25	23	23¾
Studebaker Company, com	..	..	41½	43¾
Studebaker Company, pfd	..	..	94½	97
Swinehart Tire Company	..	..	99	101
Rubber Goods Mfg. Co., com	85	95	100	..
Rubber Goods Mfg. Co., pfd	102	105	105	110
U. S. Motor Company, com	28	29	1⅛	1½
U. S. Motor Company, pfd	69	70	4	4½
White Company, preferred	..	..	107	109

*Old. †New.

announcement was made the Atlas people booked an enormous number of orders for motors, and up to the time of the failure of the Atlas Engine Works a number of prominent American manufacturers planned to use Atlas-Knight motors. With the failure of this pioneer firm, however, the car manufacturers who had so confidently counted upon using the Knight type motor were left stranded, and for some time speculation has been rife as to where they would turn for motors, inasmuch as no more licenses are to be given out in America to manufacture motors direct.

The Stearns people, under their agreement with Knight & Kilbourne, have the right to manufacture motors for the trade, and they have been laying plans for the past 6 months to put this idea into force.

Atlas Attached for Accessories

SPRINGFIELD, MASS., Oct. 7—The Atlas Motor Car Company, of Springfield, Mass., which was forced to suspend operations some weeks ago because of the failure of the Atlas Motor Car Company in the West, preventing the former company from securing motors, has been attached again. Three suits were filed against the company during the week. The Hampden Brass Company, of Springfield, Mass., filed an action for $1,500; the R. E. Dietz Company, of New York, one for $200 and the Firestone Tire & Rubber Company, Akron, O., one for $200 also.

The Havers Motor Car Company, Port Huron, Mich., has just closed its fiscal year, which is the second year it has been engaged in building the Havers six-cylinder car and have declared a stock dividend of 40 per cent. and a cash dividend of 5 per cent. This pleasant news to the stockholders came on the completion of an audit by R. H. Hollis & Company, chartered accountants of Detroit.

Market Changes for the Week

The most important changes in the market during the past week was the gain in price of Bessemer steel and open-hearth steel. Both rose $1.00, closing on Tuesday at $25.00 and $26.00 respectively. Up-river Para rubber experienced a decline of $.02 owing to the annual auction of plantations. Tin dropped in price to $4.97, a loss of $.06 per hundred pounds, caused by the freer offerings by speculators. Copper and lead remained at their old quotations. Antimony and beams and channels were constant throughout the week.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb..	.09	.09	.09	.09	.09	.09	.....
Beams and Channels, 100 lbs....	1.51½	1.51½	1.51½	1.51½	1.51½	1.51½	.....
Bessemer Steel, Pittsburgh, ton.....	24.00	25.00	25.00	25.00	25.00	25.00	+1.00
Copper Elec., lb..	.17½	.17½	.17½	.17½	.17½	.17½	.....
Copper, Lake, lb..	.17¾	.17¾	.17¾	.17¾	.17¾	.17¾	.....
Cottonseed Oil, Oct., bbl.....	6.20	6.28	6.30	6.38	6.42	6.45	+ .25
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden) ...	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals. @.....	.21	.21	.21	.21	.21	.21	.....
Lard Oil, prime...	.85	.85	.85	.85	.85	.85	.....
Lead, 100 lbs.....	5.10	5.10	5.10	5.10	5.10	5.10	.....
Linseed Oil.....	.68	.68	.68	.68	.68	.68	.....
Open-Hearth Steel, ton.....	25.00	26.00	26.00	26.00	26.00	26.00	+1.00
Petroleum, bbl., Kansas crude...	.70	.70	.70	.70	.70	.70	.....
Petroleum, bbl., Pa., crude.....	1.60	1.60	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Rubber, Fine, Up-river Para...	1.09	1.09	1.09	1.09	1.07	1.07	— .02
Silk, raw Ital....	....	4.15	....	....	4.15	....	.....
Silk, raw Japan..	....	3.95	....	....	4.02½	....	— .07½
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	.....
Tin, 100 lbs.....	5.03	5.03	5.06	5.03	5.03	4.97	— .06
Tire, scrap.....	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.09⅛	.....

Will Reorganize Knox

Tentative Plan Is to Sell the Property to a New Corporation, the Knox Motor Car Company

To Fill Present Orders Factory Must Be Operated for 4 Months—W. E. Wright Resigns

SPRINGFIELD, MASS., Oct. 5—The outlook for the Knox Automobile Company, of this city that made an assignment to Edward O. Sutton and Harry G. Fisk last week for the benefit of its creditors looks much more hopeful now than it did a few days ago. Edward O. Sutton today made an emphatic denial of the rumor that 130 men had been discharged and that the pay-roll had been cut down one-half. He stated that the company had started along the lines of intrenchment, and so it had been necessary to lay off eighty-five employees. According to Mr. Sutton, who is the superintendent and general manager, and therefore knows the real facts, the number laid off represented but 20 per cent. of the force instead of fifty as alleged. He was not prepared to say what further reductions might be made for it all depends upon business conditions.

Mr. Sutton stated that the prospects are more encouraging than could have been expected for the continuation of the business. He pointed out that at the time of the assignment there were orders on the books for seventy-one vehicles, and since that time eight more were received, two of which reached the company yesterday. To fill these orders it will be necessary to operate the factory for at least 4 months, and as the indications are that the business will be coming in as usual no necessity for a shut-down is expected.

Agents and old customers have been sending in letters to show their loyalty to the company, assuring the firm of their continued business and support. In addition to this the majority of the creditors have not been inclined apparently to press their demands, and this friendly attitude gives a brighter outlook for the future operation of the plant. Some thousands of dollars are owed the company in many cities and towns and it will eventually be paid, but the collection of these debts takes time and the pressing demands are ready cash for working capital.

Plans for the reorganization of the company have not been completed yet, but they are under way. It is the wish of the officials to continue operation until capital can be interested. The support of the Board of Trade will be solicited to aid in the reestablishment of the company on a sound basis and this will be of much help. Mr. Sutton stated that by figuring in the real estate owned by the company the assets would amount to more than the liabilities and that this would be of much value in bringing about a plan for continued operation. He added, however, that the officials would be willing to sell outright if a fair price could be secured.

SPRINGFIELD, MASS., Oct. 9—Trustees of the Knox Automobile Company have announced that negotiations are under way to reorganize the company. The tentative plan under consideration is to sell the property to a new corporation to be known as the Knox Motor Car Company. Details of the plan have not been outlined so far to the public.

W. E. Wright, vice-president and general manager of the Knox Automobile Company, Springfield, Mass., has resigned as one of the results of the financial embarrassment of the company and the new management. Mr. Wright has been a prominent figure in the automobile world for a number of years. His plans for the future have not been announced.

Exports At High Level

July Report Shows 50 Per Cent. Increase Over Last Year and 65 Per Cent. 7 Months of 1912

WASHINGTON, D. C., Oct. 7—Reports for July of the Department of Commerce and Labor, bureau of foreign and domestic commerce, show that the value of domestic automobiles and automobile parts exported from the United States is steadily growing. The total for July, 1912, was $2,096,933, as compared with $1,360,089 in July, 1911. The total for the seven months ending July, 1912, was $18,311,925, as against $11,096,271 for the 7 months ending July, 1911.

The bulletin shows that in July, 1912, the value of automobiles and parts imported was but $173,261, as compared with $197,451 in July, 1911. The total for the 7 months ending July, 1912, however, is somewhat larger than for the same period in 1911, although a big falling off for 1912 is shown by comparison with the same period in 1910.

Under the heading of exports of foreign merchandise from the United States it is shown that but three automobiles, of a total value of $7,000, were exported in July, 1912, as against six machines of a total value of $12,095, in July, 1911.

Rubber Show's Daily Attendance 3,500

WITH a banquet held at the Plaza Wednesday night and an auction of the prize-winning plantation rubber exhibit at the Grand Central Palace, on Thursday, the Third International Rubber Exposition came to an end. It was a big success in its way, although compared with the attendance at an automobile show the crowds were small.

The banquet was attended by representatives of the rubber industry in the United States as well as the exhibitors at the show, the exhibitors numbering about 120. John Barrett, director of the Pan-American Union, was a guest of honor as was also Baron da Gama, Brazillian ambassador. Mr. Barrett said that the world was just entering an era of tremendous development that will see typical expression in the rubber industry. Baron da Gama said that Brazil as the largest producer and the United States as the largest consumer of rubber would inevitably be drawn closer together in a commercial sense.

The crude rubber shown in the Brazilian space at the show was all sold to American manufacturers before the show opened, the prices ranging up to $1.15 a pound for up-river fine and correspondingly lower for the other grades on exhibit. The total amount of the sale was not announced. The plantation rubbers shown by Ceylon and Malaya, amounting to something under 30 tons, brought an average of $1.10 1-2 a pound, the top of the market being for the gold medal winning lot, $1.19 a pound.

The attendance at the show, including all visitors, averaged over 3,500 a day. This would make the total 31,500.

N. A. A. M. Elects Seven Members

The following companies have been elected to membership in the National Association of Automobile Manufacturers: Borland & Grannis Company, Flanders Electric Company, Speedwell Motor Car Company, Michigan Buggy Company, McFarlan Carriage Company, Argo Manufacturing Company and the Broc Manufacturing Company.

Past Fortnight Showed Big Car Shortage

According to the fortnightly bulletin of the American Railway Association for the period ending September 26, there was a net shortage of freight cars in the United States of 17,790. This is an increased net shortage from September 12 of 9,170 cars. Along in March of this year the unofficial figures showed that

ARTICLES	JULY— 1911 Quantities	1911 Values	1912 Quantities	1912 Values	1910 Quantities	1910 Values	SEVEN MONTHS ENDING JULY 1911 Quantities	1911 Values	1912 Quantities	1912 Values
IMPORTS OF MERCHANDISE										
Automobiles, and parts of										
Automobiles..No..dut.	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301
Parts of (except tires) dut.	.....	21,710	.....	18,010	.....	548,136	.....	211,671	.....	164,348
Total automobiles, and parts of.....	.....	197,451	.....	173,261	.....	1,802,133	.....	1,278,762	.....	1,246,649
EXPORTS OF DOMESTIC MERCHANDISE										
Automobiles, and parts of										
Automobiles.....No..	1,025	1,104,807	.....	.....	5,314	7,369,486	8,935	9,194,564	13,860	13,715,535
Commercial.....No..	.....	.....	78	156,458	.....	.....	.....	.....	78	156,458
Passenger.....No..	.....	.....	1,557	1,546,179	.....	.....	.....	.....	1,557	1,546,179
Total.....No..	1,025	1,104,807	1,635	1,702,637	5,314	7,369,486	8,935	9,194,564	15,495	15,418,172
IMPORTS BY ARTICLES AND COUNTRIES										
Cars, Carriages, etc.										
Automobiles—										
France.....No..	22	56,142	36	95,433	373	670,340	178	383,959	252	617,242
Germany.....No..	14	33,080	6	18,063	77	196,805	88	193,092	36	87,149
Italy.....No..	10	14,578	6	11,111	94	176,470	50	82,610	46	74,965
United Kingdom...No..	10	21,469	5	8,810	45	113,955	78	190,740	88	209,186
Other countries...No..	24	50,472	11	21,834	45	96,427	98	216,690	45	93,759
Total.....No..	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301
EXPORTS BY ARTICLES AND COUNTRIES										
Cars, passenger and freight, and automobiles		*Dollars*		*Dollars*		*Dollars*		*Dollars*		*Dollars*
Automobiles—										
France.....No..	33	45,544	36	31,843	181	567,788	273	326,800	430	333,063
Germany.....No..	16	14,357	22	21,188	78	227,546	73	91,283	252	199,726
Italy.....No..	32	20,508	36	26,795	96	333,230	137	169,914	176	169,252
United Kingdom...No..	229	219,153	345	230,924	979	1,903,186	1,875	1,653,995	3,676	2,739,948
Other Europe.....No..	60	70,522	147	124,672	316	495,949	508	492,222	1,023	859,446
Canada.....No..	289	365,989	462	686,889	2,645	2,600,604	3,724	3,925,265	5,197	6,253,889
Mexico.....No..	7	18,285	9	14,683	177	330,055	147	258,064	125	183,020
West Indies and Bermuda.....No..	21	21,454	13	12,166	133	216,033	175	210,432	196	208,303
South America.....No..	48	69,105	180	198,798	180	205,487	444	604,229	1,071	1,288,543
British Oceania...No..	168	156,951	209	184,034	252	173,278	938	858,196	2,128	1,948,505
Asia and other Oceania No..	91	75,106	133	124,086	102	122,439	477	428,119	843	878,678
Other countries...No..	31	27,833	43	46,559	175	193,891	164	176,045	378	355,799
Total.....No..	1,025	1,104,807	1,635	1,702,637	5,314	7,369,486	8,935	9,194,564	15,495	15,418,172

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Garage Equipment Mfg. Co.—Manufacturers of auto accessories, 742-48 S. Pierce St., Milwaukee, Wis.

Exports At High Level

July Report Shows 50 Per Cent. Increase Over Last Year and 65 Per Cent. 7 Months of 1912

WASHINGTON, D. C., Oct. 7—Reports for July of the Department of Commerce and Labor, bureau of foreign and domestic commerce, show that the value of domestic automobiles and automobile parts exported from the United States is steadily growing. The total for July, 1912, was $2,096,933, as compared with $1,360,089 in July, 1911. The total for the seven months ending July, 1912, was $18,311,925, as against $11,096,271 for the 7 months ending July, 1911.

The bulletin shows that in July, 1912, the value of automobiles and parts imported was but $173,261, as compared with $197,451 in July, 1911. The total for the 7 months ending July, 1912, however, is somewhat larger than for the same period in 1911, although a big falling off for 1912 is shown by comparison with the same period in 1910.

Under the heading of exports of foreign merchandise from the United States it is shown that but three automobiles, of a total value of $7,000, were exported in July, 1912, as against six machines of a total value of $12,095, in July, 1911.

Rubber Show's Daily Attendance 3,500

WITH a banquet held at the Plaza Wednesday night and an auction of the prize-winning plantation rubber exhibit at the Grand Central Palace, on Thursday, the Third International Rubber Exposition came to an end. It was a big success in its way, although compared with the attendance at an automobile show the crowds were small.

The banquet was attended by representatives of the rubber industry in the United States as well as the exhibitors at the show, the exhibitors numbering about 120. John Barrett, director of the Pan-American Union, was a guest of honor as was also Baron da Gama, Brazillian ambassador. Mr. Barrett said that the world was just entering an era of tremendous development that will see typical expression in the rubber industry. Baron da Gama said that Brazil as the largest producer and the United States as the largest consumer of rubber would inevitably be drawn closer together in a commercial sense.

The crude rubber shown in the Brazilian space at the show was all sold to American manufacturers before the show opened, the prices ranging up to $1.15 a pound for up-river fine and correspondingly lower for the other grades on exhibit. The total amount of the sale was not announced. The plantation rubbers shown by Ceylon and Malaya, amounting to something under 30 tons, brought an average of $1.10 1-2 a pound, the top of the market being for the gold medal winning lot, $1.19 a pound.

The attendance at the show, including all visitors, averaged over 3,500 a day. This would make the total 31,500.

N. A. A. M. Elects Seven Members

The following companies have been elected to membership in the National Association of Automobile Manufacturers: Borland & Grannis Company, Flanders Electric Company, Speedwell Motor Car Company, Michigan Buggy Company, McFarlan Carriage Company, Argo Manufacturing Company and the Broc Manufacturing Company.

Past Fortnight Showed Big Car Shortage

According to the fortnightly bulletin of the American Railway Association for the period ending September 26, there was a net shortage of freight cars in the United States of 17,790. This is an increased net shortage from September 12 of 9,170 cars. Along in March of this year the unofficial figures showed that

IMPORTS OF MERCHANDISE

ARTICLES	JULY— 1911 Quantities	1911 Values	1912 Quantities	1912 Values	1910 Quantities	SEVEN MONTHS ENDING JULY 1910 Values	1911 Quantities	1911 Values	1912 Quantities	1912 Values
Automobiles, and parts of										
Automobiles..No..dut.	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301
Parts of (except tires) dut.	.....	21,710	.....	18,010	.....	548,136	.....	211,671	.....	164,348
Total automobiles, and parts of.....	.....	197,451	.....	173,261	.....	1,802,133	.....	1,278,762	.....	1,246,649

EXPORTS OF DOMESTIC MERCHANDISE

Automobiles, and parts of										
Automobiles.....No..	1,025	1,104,807	.....	.....	5,314	7,369,486	8,935	9,194,564	13,860	13,715,535
Commercial.....No..	.....	.....	78	156,458	.....	.....	.....	.....	78	156,458
Passenger.....No..	.....	.....	1,557	1,546,179	.....	.....	.....	.....	1,557	1,546,179
Total.....No..	1,025	1,104,807	1,635	1,702,637	5,314	7,369,486	8,935	9,194,564	15,495	15,418,172

IMPORTS BY ARTICLES AND COUNTRIES

Cars, Carriages, etc.										
Automobiles—										
France.....No..	22	56,142	36	95,433	373	670,340	178	383,959	252	617,242
Germany.....No..	14	33,080	6	18,063	77	196,805	88	193,092	36	87,149
Italy.....No..	10	14,578	6	11,111	94	176,470	50	82,610	46	74,965
United Kingdom...No..	10	21,469	5	8,810	45	113,955	78	190,740	88	209,186
Other countries...No..	24	50,472	11	21,834	45	96,427	98	216,690	45	93,759
Total.....No..	80	175,741	64	155,251	634	1,253,997	492	1,067,091	467	1,082,301

EXPORTS BY ARTICLES AND COUNTRIES

		Dollars		*Dollars*		*Dollars*		*Dollars*		*Dollars*
Cars, passenger and freight, and automobiles										
Automobiles—										
France.....No..	33	45,544	36	31,843	181	567,788	273	326,800	430	333,063
Germany.....No..	16	14,357	22	21,188	78	227,546	73	91,283	252	199,726
Italy.....No..	32	20,508	36	26,795	96	333,230	137	169,914	176	169,252
United Kingdom...No..	229	219,153	345	230,924	979	1,903,186	1,875	1,653,995	3,676	2,739,948
Other Europe.....No..	60	70,522	147	124,672	316	495,949	508	492,222	1,023	859,446
Canada.....No..	289	365,989	462	686,889	2,645	2,600,604	3,724	3,925,265	5,197	6,253,889
Mexico.....No..	7	18,285	9	14,683	177	330,055	147	258,064	125	183,020
West Indies and Bermuda.....No..	21	21,454	13	12,166	133	216,033	175	210,432	196	208,303
South America....No..	48	69,105	180	198,798	180	205,487	444	604,229	1,071	1,288,543
British Oceania...No..	168	156,951	209	184,034	252	173,278	938	858,196	2,128	1,948,505
Asia and other Oceania No..	91	75,106	133	124,086	102	122,439	477	428,119	843	878,678
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Salesmen Experts Gather

Convention at Indianapolis Attracts the Attendance of 400 from the Ranks of the Automobile Industry

INDIANAPOLIS, IND., Oct. 8—**Special Telegram**—Four hundred automobile dealers, members of the selling organizations of the automobile concerns of the country, and advertising agents, gathered in the auditorium of the Claypool Hotel, this city, at the opening session this afternoon, of the first general sales convention of automobile dealers, following a luncheon tendered to the visitors by the Mahin Advertising Company. Many prominent automobile dealers, manufacturers and advertising men are here for the 2-day meeting believing that the future of the motor car industry hinges upon the sales education of the dealer and on the ability of both the selling organizations and advertising departments to intensify retail sales. Men in this field of the industry responded eagerly to the suggestion of J. J. Cole, of the Cole Motor Car Company, that a convention of this nature be launched in Indianapolis, second only only to Detroit in the automobile field.

Intensity is the slogan of the gathering. Naturally, everything rests with the dealer, for if he fails, all fail. And, so, the main objects of the convention are to teach the dealer how best to increase his sales, and to impress upon him the need for absolute co-operation with the factory whose car he sells.

Almost all American cars of today are good ones and will stand rigid investigation, and it only remains to get them before the people in a business-like way.

An enormous growth of the motor car industry should result from the present concerted movement for a combined effort to sell machines to the people.

W. D. Nesbitt presided at the session, during which six speeches were heard, the first of which was an address of welcome by J. J. Cole in behalt ot the city of Indianapolis. "The idea of helping the dealer in all his problems is worthy of all the effort the car manufacturer can give," he said. H. O. Smith, president the Premier Motor Mfg. Co., was the next to talk. "The selling problem is the big one, not only with the automobile but with every branch of business," he said. "A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold a good car very long." Mr. Smith stated emphatically that **there is nothing today which even promises to rival the automobile as a solver of the transportation problem. To increase sales, educate the salesmen. It is most important for the dealer to select the best selling line for his particular territory. Further, he must have confidence in his line, else he cannot hope to enthuse his prospects over what he has to sell.**

C. F. Kettering, of Dayton, O., spoke on some of the human interest sides of salesmanship. "Automobiles have become so common," he said, "that we have slipped somewhat away from calling to the attention of him, who does not know about such things, what wonderful pieces of mechanism they are. Thousands still look upon them as experiments and to sell to such it is necessary to get them interested in the motor car development. Relate in a human interest way the story of the manufacture of a tire, of a gear, or of any other part of the car make up, and you have the man interested. Do not say that he must lubricate a certain part, but show him the result of not doing so. Get the novice to understand the mechanical reasons for doing this or that, and you not only have a satisfied customer, but he will return to you when in the market again."

Leroy Pelletier of the Flanders Company gave a most entertaining talk on the co-ordination of advertising and sales. He is strongly in favor of conventions such as this. The main idea of the gathering is for every man to learn to get in and boost for the product in the sales of which he is interested. The company competitor who gives him the greatest run is the one he admires most. Mr. Pelletier believes that when we get a perfect co-ordination between the advertising and sales ends of a concern, there is nothing which that concern cannot do. It is hard for the dealer to realize that the national advertising campaign is for his benefit, but this is the case, although it is a selfish interest which the car maker has in him for dealers' sales mean factory sales. It is important for the dealer to know just what has been said in the advertising, otherwise he cannot talk intelligently to those who come in response to such advertising.

There is not a large percentage of good salesmanship in the automobile business according to Pelletier. The adding machine and the cash register salesmen are much better at it, for the only reason which the factories will recognize for not securing an order from a prospective customer is the death of the customer.

The repair man should be a consummate salesman and not a knocker, as is too often the case.

Speaking further of the convention, he said that the idea cannot fail because it is a good one. Next year the attendance will be much greater.

Charles A. Bookwalter, ex-mayor of the city, was the next to speak. He traced the evolution of the automobile from the ancient means of transportation down to the present almost perfect car, he characterized the automobile industry as being one of the great strong, red-blooded businesses of today. It is so great as to be inestimable in dollars and cents. It has been for many years the backbone of the industrial growth of Indianapolis, and in 1907 was the one thing which prevented the panic of that year from seriously affecting the city. He also advocated the boosting of the products of others, for by so doing confidence in the products of all makers is infused in the minds of the buying public. Mr. Bookwalter also talked on good roads and their value to the farmer. It is the accessibility of lands to markets that fixes the value of such lands, and there is nothing which offers such accessibility as good roads and automobiles in addition to electric railroads. Good roads are also educational for they offer a means of getting about and seeing what is going on in the world.

There is no one in the industry who would not benefit by Carl G. Fisher's proposed trans-continental highway.

Elbert Hubbard, of East Aurora, N. Y., was the last speaker of the day, his topic being "Ideal Salesmanship." He was glad to see harmony and good fellowship displayed at such a convention. A few years ago automobile salesmen had trade secrets, but today they are all pulling together for the common good. Mr. Hubbard said, "When you sell a man a car you do him a favor, for you give him an opportunity to get out into the great out-of-doors, which is to his advantage."

At 5:30 a speedway dinner was given to the visitors in the banquet hall of the Claypool. Following the dinner the crowd marched to Thompson Hall where Elbert Hubbard again talked, on "Sentiment in Business."

On Wednesday morning the convention will convene at 9:30, at which session talks by John G. Jones of the Alexander Hamilton Institute, New York, on "Headwork in Salesmanship"; T. J. Zimmerman, Chicago, on "The Opportunity of the Motor Car Dealer"; John L. Mahin, Mahin Advertising Co., on "How to Use Advertising in the Retail Game"; B. F. Lawrence, Indianapolis, on "How to Get the Co-operation of Your Local Newspapers," and John Wetmore, New York *Evening Mail*, on "How to Spend Your Advertising Appropriation," will end the business of the unique convention, which bids fair to be held again next year.

Ready Graphic Method for Finding Proportions for Intermediate Gears Giving Most Convenient Operation and Best Utilization of Power—Summary of German Army Experience with Trucks and Trailers Expressed in New Rules

FREIGHTER'S Equipment on Army Plan—The demands of the German military authorities with regard to the construction and equipment of motor trucks with trailers which are to be accepted as suitable for the freighting work of the army in case of war, and which on this basis are to be subsidized while used for private purposes in time of peace, command a widespread interest in so far as they exemplify a full set of rules by whose observance it is believed that a maximum of reliability—with some sacrifice of other considerations—in heavy freighting by motor power may be secured. The rules are expressed partly in the legislative traffic regulations of the empire, to which all vehicles must conform, partly in drawings which illustrate types of construction and which are kept on file in the experimental department of the general staff, and, finally, in specific rules. The drawings and the rules are changed from year to year to keep pace with increasing experience and technical progress. The new rules, which begin to apply to vehicles submitted for approval after April 1, 1913, have just been published and comprise 90 paragraphs. They refer only to trucks intended to be used with a trailer, for the so-called army freight train, in the heaviest hauling service, and this work presents some parallels with the requirements in that extension of railway freight service by means of motor trucks and trailers which is said to be contemplated in the United States in several instances, as well as with private heavy freighting in the Far West and in the Canadian Dominion. The following brief extracts from these provisions may be of interest:

EXTRACT OF RULES FOR 1913

The army train consists of one motor truck and one trailer. [It has been found impracticable, so far, to use more than one trailer.]

The truck must be capable, winter and summer, with two men up, full equipment (as specified in other rules) and a payload of 4,000 kilograms (4 long tons) to draw a trailer with one man up, full equipment and 2,000 kilograms payload over hard roads with grades of up to 1 in 7.

The vehicle speed at normal maximum motor speed must not exceed 16 kilometers (11 miles) per hour, subject to a 15 per cent. increase by use of the accelerator, the action of the accelerator pedal being limited by a governor. The operation of the vehicle must be as noiseless as the state of the art permits Double spring suspension of the axles is desirable (meaning an extra set to go into action for heavy loads).

The weight of the complete vehicle must not exceed 4,000 kilograms, including its normal equipment, spare parts, etc., and must not exceed 8,000 kilograms with load and crew. The rear axle load is limited to 5,500 kilograms. The width of the vehicle must at no point exceed 2 meters. The track is limited to 1.55 meters, the wheelbase to 4.5 meters. The wagon box must have a volume capacity of at least 6 cubic meters and must not be more than 3.6 meters long. Rear and side boards of the box must be hinged at the floor level, opening outward and downward. To protect the load, removable iron tilts, affording a waterproof roof, must be attached to the top of the wagon box by means of staples, rings, chains and lock. The total height from the ground must be within 4 meters.

Three commodious seats for the crew must be protected against the weather. A removable dustshield is to be arranged between the truck and the trailer to protect the brakeman of the latter. A reliable signaling device for mutual use between the truck driver and the brakeman must be provided. Every part of the loaded wagon, excepting only the wheels and steering knuckles, must be at least 28 centimeters (11 1-5 inches) above the ground. The tie rod of the steering system must be behind the front axle.

The fuel feed may be by gravity (but not affected by a grade of 1 in 7) or by pressure. If exhaust gases are used, the valve regulating the pressure must be of a prescribed pattern (drawings on file). Noise from the exhaust must be reduced to a minimum. A cut-out close to the motor and controlled from the driver's seat is to be so attached that it may be removed in case of war. Lost motion in the steering system must be reduced to a minimum by suitable construction.

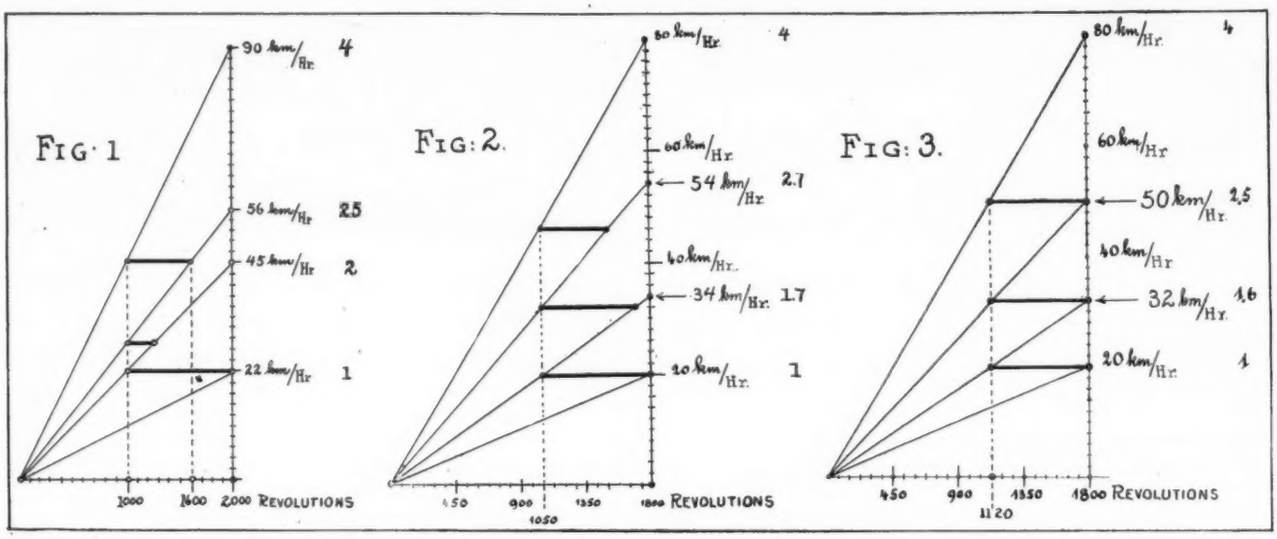
Rear wheel brakes must be compensated, internal and lockable. In a chain-driven truck the brake drum should be 450 millimeters (18 inches) in diameter and 80 millimeters (3 1-5 inches) broad. The transmission brake must be water-cooled and actuated by a pedal. It shall be possible to brake the trailer from the truck driver's seat. To this end a crank to the left of the latter connects with a rigid rod extending rearward under the middle of the truck and connecting by easily removable chain attachment (of a prescribed pattern) with the brakes of the trailer.

A two-armed sprag must be mounted so as to be secure against being overrun by the vehicle. When it is drawn up, its lowest point must not be below the rear axle. A lettered device on the dashboard must always show the position of the sprag. The sprag of the trailer must be so connected with the truck driver (in a prescribed manner) that he can work it.

The design of the coupling between truck and trailer is specially prescribed. It is at a height of about 32 inches, cushioned against both pull and thrust and so dimensioned that there is a distance of 12 inches between the nearest parts of the two vehicles when the trailer stands at right angles with the truck. The truck must be able to turn on a radius of 6.5 meters for the inside wheels. To safeguard driving on icy, snow-covered and slippery roads only solid-rubber tired wheels are allowed, and these must be provided with facilities for the attachments of traction chains, especially a sufficient number of lugs or pins projecting laterally from the felloes. The wheels must be of steel.

The front wheel tires must be 830 millimeters in diameter and 120 millimeters broad, and the rear tires 1,030 to 1,040 millimeters in diameter and either 280 millimeters broad with a deep central groove (prescribed design) or of the twin type with each tire 140 millimeters broad.

On the front member of the frame there must be two strong



Figs. 1 and 2—Diagrams of unsatisfactory gear proportions in four-speed cars with high and low gears in 1 to 4 ratio. Fig. 3—Diagram of correct gear under similar conditions

hooks for drawing the whole train of truck and trailer out of a predicament and at the rear similar hooks for the attachment of the trailer. Large sandboxes must be secured to the frame in front of the driving wheels with convenient arrangements for filling and discharging. There are further to be secured to the outside of the vehicle, with easy access from the outside, a box for traction chains, a toolbox, a baggage box and a box for firearms. The box for chains must have a perforated bottom to permit water to drain off; the others must be tight and lockable.

The motor hood must be provided with a lock and must not shut off the view of the road more than is unavoidable. Gates in the crankcasing must permit the handy replacement of connecting rod bearings. The carbureter must function properly with benzol and benzine (gasoline) of any grade as well as with other equivalent fuels. An arrangement must be provided for the use of heavy fuels which do not ignite easily. Ignition must be by high-tension single-spark magneto easily replaceable. A spare magneto must be supplied and carried. An electromagnetic motor starter which can be operated by hand must be secured to the dash, or else an equivalent device. Lubrication must be by force feed with an indicator observable at night as well as in the day time; for which purpose a lamp must be provided. The amount of oil used must be so large that its temperature will never rise above 80 degrees centigrade. Its fluidity during cold weather must be secured. The water in the radiator must never boil or run over. All low points in the water system must have drains. The connection hose must be of 22, 30 or 40 millimeter inside diameter. The fan must be driven by belts of at least 32 millimeter width.

The clutch must have an external leather facing at least 60 millimeters broad. The possibility must be established of mounting upon a shaft which revolves at the same speed as the motor shaft two separate belt pulleys of each 300 millimeters (12 inches) diameter and 80 millimeters width. The change-gear, of the sliding-gear type, must be stamped to show the lever position for each gear. Clutch and brake pedals must be independent. The gears must at normal motor speed give the following vehicle speeds: Low gear, 3 to 4 kilometers; second, 5 to 7 kilometers; third, 9 to 13 kilometers, and high, 16 kilometers. [It will be noticed that these gear ratios do not correspond very closely with those indicated as correct by Von Löw in the preceding article.—Ed.] Departures within 10 per cent. of this schedule are allowed.

The drive system—by shaft, chain or worm—is optional, but if chains are used the pattern is prescribed. The distance from the central plane of tires to that of chains should be 225 millimeters (9 inches). Sheet iron shields should be attached between the wheel fellies and the chains to protect the latter against the coarsest dirt and to prevent interference with the traction chains. Closed chain casings may be allowed on application, but must be easily removable, and shields are in such cases to be supplied as spare parts. The screw threading of the chain adjuster must be protected against rust.

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Most of the remaining provisions in the new rules relate to the equipment and to the details of the trailer.—From *Zeitschrift des Mitteleuropäischen Motorwagen Vereins*, middle of September.

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PROPER Proportions of Gear Speeds—The highest and the lowest gear speeds of an automobile are determined by the demands to be made of the vehicle. The required capacity for climbing hills must decide the low gear and the required maximum speed on the level decides the high gear. In this the consideration of variable loads is to be included, of course. The selection of the intermediate gears, however, should properly be decided mathematically when the extreme gears have been chosen. But a review of the gears actually used in German cars of 1912 manufacture reveals many variations from the proportions which should be observed, and these variations in every case involve a loss of convenience in managing the car. [The author here gives a tabulation of the gears in many German cars.—Ed.] When a builder is asked why he makes the interval between the high speed and the third speed greater—as he usually does—than between the third and the second, the answer is frequently that nowadays, with direct drive on the high speed, there is a saving of power from doing away with gear friction on the high speed which justifies this arrangement, but this is not in reality the most important reason for dividing the gear ratio unevenly. The author can offer a better one from his personal experience. He has driven two H cars and three A cars about 30,000 kilometers. One of the H cars weighed with normal load about 1,200 kilograms; the other H car and the three A cars 1,400 kilograms. The gear ratios were in the H cars 1—2—2.49—4 and in the A cars 1—1.7—2.7—4.

With the H cars it was always pleasant to go from the fourth to the third gear. After the third gear was in the car jumped right ahead. But in going from the third to the second the motor would hang back and, as a rule, it soon became necessary to go from it to the low. The second speed was consequently very little used with these cars; this result was unavoidable with the lighter car of this type as well as with the heavier one, which both had the same reduction (1 to 3.2) in the rear axle. Prob-

ably for this reason the builder of these cars chose the second speed considerably lower, as mentioned above, in the A cars which he built later. On the other hand, while the H cars pulled excellently on the third speed, the A cars do not share this property, although their gear ratio for the third speed really does not lie much higher than in the H cars. With the A cars it is necessary to drop to the second very soon, and on this gear the cars then work nicely again.

These experiences can be explained very clearly by diagrams. In Fig. 1 the oblique lines represent the relations between motor speed in revolutions per minute and vehicle speed in kilometers per hour for the four gear speeds of the H cars. Let it be assumed that the gear is lowered whenever the motor speed drops to 1,000 revolutions. By looking at Fig. 1 it is now seen that by going from the high to the third the motor goes from 1,000 to 1,600 revolutions, and the latter is a speed close to that at which the motor does its maximum of work. But in going from the third speed at 1,000 revolutions to the second the motor goes only to 1,200 revolutions, which is not close to its best speed, and consequently it does not pull the car so well, and if the grade of the road rises a little, pulling the motor speed down to 1,000 again, it soon becomes necessary to drop to the low gear. And by this last change a very high motor speed is reached, as the diagram shows, so that it becomes desirable to throttle down, and the diminished efficiency of the motor under the throttle has again no favorable influence on the car.

Fig. 2 applies to the A cars and shows the favorable transition from the third to the second speed in accordance with the actual experiences above referred to, it being understood that 1,800 revolutions and not 2,000 revolutions is the speed at which the motor operates most efficiently.

THE SIMPLE GRAPHIC TEST OF CORRECT GEAR RATIOS

These diagrams have shown what demands must be made of a good change-gear mechanism. In any diagram representing it the heavily drawn horizontal lines must be of equal length. Speaking without reference to the graphic mode of expressing it, the transition from one gear to another must in all cases be accomplished between the same limits of motor speed. A gear corresponding to this requirement is represented in diagram Fig. 3. Here it is seen that every time the gear is changed—at 1,120 revolutions in this case—the motor goes to 1,800 revolutions on the lower gear. This diagram therefore also supplies the correct gear ratios. Under the supposition that the low and the high gears are in proportion of 1 to 4, the intermediate gears should be at 1.6 and 2.5. Unfortunately not a single gearbox among those examined in the German cars conforms to this requirement. And were the friction loss on the lower gears to be considered, the figures 1.6 and 2.5 would be reduced even a little more, and the gear ratios used in practice, being too high, would be found still a little farther removed from the correct ones.

That the diagrams presented have been based upon revolutions alone, and not upon curves of efficiency or torque, is no error, since the favorable portion of the torque curves naturally lies between the motor speeds chosen as limits.

If a gear is to be designed for a car in which the low and high gears must be farther apart than 1 and 4 and should be, for example, in the proportion of 1 to 6, which would be suitable for a car used in hilly districts, the correct gear proportions are those shown in diagram Fig. 4; namely, 1—1.8—3.3—6.

CHECKING RESULTS BY ANOTHER METHOD

These proportions for the intermediate gears, as given in the foregoing, have been arrived at by investigating actual driving experiences with different cars by the graphic method. The results are confirmed by reasoning in another way. Let it be assumed that the gears in a car are proportioned as 1, 2, 3 and 4 and that they are intended for vehicle speeds of, respectively, 0 to 15, 15 to 30, 30 to 45 and 45 to 60 kilometers per hour. With these limits for each gear range, the number of revolutions of the motor may vary 50 per cent. from the maximum on the second speed and only 25 per cent. on the high speed. Here is the error which prevents the proper utilization of the motor power on every gear. Every motor has a favorable working range which lies between two motor speeds, for example 1,800 and 1,200 revolutions. Above 1,800 revolutions the inertia of the reciprocating parts becomes a disturbing factor, and below 1,200 revolutions the horsepower drops so low that the gait of the car is influenced too strongly by variations in the road and load conditions as well as by variations in the condition of the motor itself. If now the second gear of a car were intended for vehicle speeds from 15 to 30 kilometers per hour, the favorable working range of the motor would be materially transgressed, while the object of the gear distribution is exactly to enable the driver to utilize the favorable working range of the motor on each of the gears. Relations between gear and vehicle speeds which approximately correspond to this requirement, in the case of a motor whose best working range lies between 1,200 and 1,800 revolutions, would be the following. (Exact numerical conformity with the requirements is excluded for constructive reasons, as, for example, it is physically impossible to have a fractional number of gear teeth):

Low gear	for 10 to 15	kilometers	per hour.
Second gear	for 16 to 24	"	"
Third gear	for 26 to 39	"	"
High gear	for 40 to 60	"	"

In this schedule, it will be seen, the limit figures of the vehicle speeds are always in the same proportion as 1,200 to 1,800, or as 2 to 3.

In order to try out the results obtained by the graphic method, this schedule may be compared with the gear proportions shown in Fig. 3. By multiplying 15, which is the upper limit for the vehicle speed on the low gear in the schedule, by 1.6 and 2.5, which are the ratios of the intermediate gears in Fig. 3, the following schedule of vehicle speeds is obtained:

Low gear	for up	to 15	kilometers	per hour.
Second gear	for 15	to 24	"	"
Third gear	for 24	to 37.5	"	"
High gear	for 37.5	to 60	"	"

That these figures do not correspond precisely with those in the previous schedule is due to the fact that the values of 1.6

(*Continued on page 741.*)

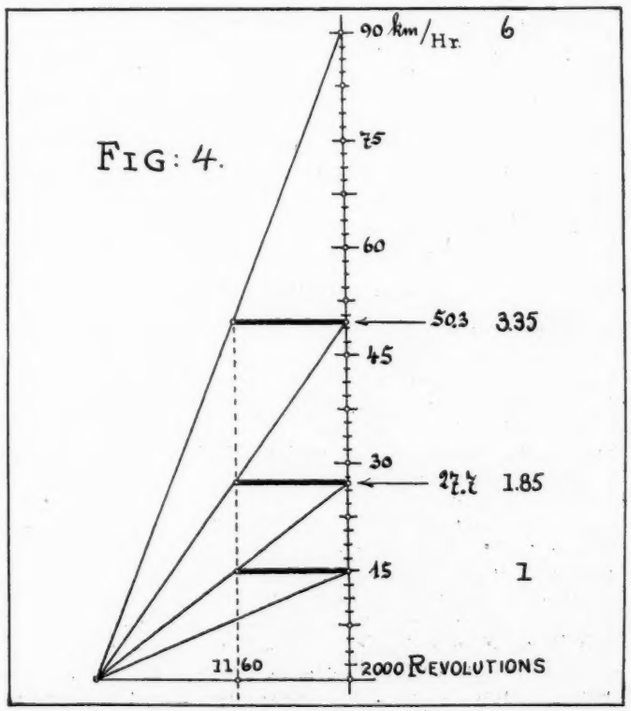


Fig. 4—Diagram of correct intermediate gear proportions in four-speed car with high and low gears in 1 to 6 ratio

Foreign Constructions Designs and Practices

Cylinder Casting of Germany, France and England Compared—German Design Leads—Flares and Bulges Used

HAVING thoroughly looked into the art of casting and machining cylinders for automobile motors, beginning in England, and, after a month of diligent effort, transferring the investigation to France for fully a month, it was not so difficult to run down the German practice, whereas, in Austria there is little to be learned that is not already covered in the practices of the other countries named. The main point in view is to observe with the minutest care any differences that may exist between the practices in these countries and the cylinder work which is being done in America. It is a well-appreciated fact among American automobile engineers that good cylinders are hard to get. The question is, have we the reasons at our finger's end? Do we know why we have troubles in this important department?

Were it possible to say that all cylinder work which is being done in America presents substantially the same measure of trouble; if it might also be said of foreign cylinder work that it is equally troublesome in every way; then, as an obvious deduction, the conclusion might be reached that the difficulties observed are natural and unavoidable either at home or abroad. We are deprived of the right of reaching this conclusion for three reasons:

One—There is a wide variation in the results obtained by various designers for their cylinders in a given foundry in America.

Two—There is a marked variation in the quality of cylinder work from given patterns run off in different foundries in America.

Three—There are disconcerting deviations from expected results, using patterns which are proven to be good for the purpose, these variations taking place from time to time in the same foundry, referring again to American practice.

Do Foreign Cylinders Vary?

That there are a plurality of reasons for the variations of quality of cylinders for American practice is apparent from the statements of the actual facts as presented. Naturally, the next question is, Are foreign-made cylinders subject to the same variation; if not, why not? If so, what is to be done to improve the foundry art of making cylinders for the purpose of the automobile trade?

In answer to the first question: Foreign-made cylinders are more or less subject to the same variations as the American product, but the extent of troubles experienced in the respective directions differs from the American expectation. French foundries are capable of producing better castings from inferior designs of cylinders than the cylinders of poor design that are likely to be obtained elsewhere. It may be on this account that so many French cylinder designs are faulty. In Germany the design is always more nearly perfect than on other European countries. As a matter of fact, some of the best German cylinder designs are quite up to the best work in America. In England, while there are some conspicuously good cylinder undertakings, there is such a swarm of mediocre work done, not only in designing but in the country as well, that the good examples are difficult to pick out.

There is a great lack of uniformity in practice in the several countries referred to, as this class of work is being done. These differences are: One—In America, on account of the low standard of foundry practice, designers are compelled to pay great attention to the details of designs and the pattern work.

Two—In England it is extremely difficult to reach any conclusion that may be stated as a rule. Observation tells that some of the foundries do first-rate work; more of them must be consigned to a lower level. In matters of design it is fair to state that designers calculate upon getting first-rate foundry work, and they reduce their efforts to place a close limit on cost accordingly.

Three—In France the foundry work is so fine that designers

Preferred Cylinder Jacket Design

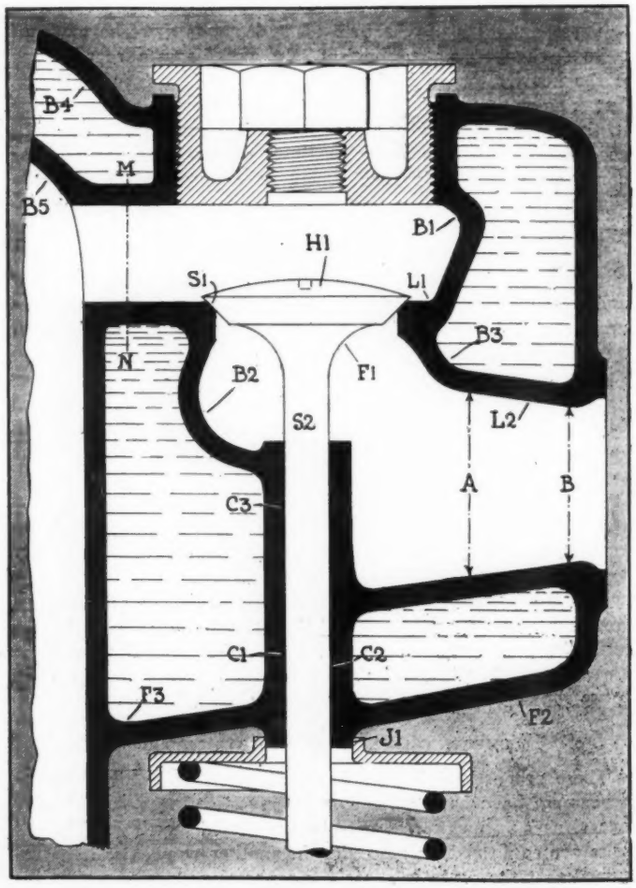


Fig. 1—Section of a poppet-valve type of cylinder through the exhaust-valve chamber, showing (slightly exaggerated) bulging and flaring walls, and a "choke" in the exhaust port

offend principle without suffering the consequences to be expected.

Four—In Germany the designs are painstaking and the foundry work is also good.

What are the hidden features of design which are only present in the best examples of cylinders?

Good Features of Design

The answer to this will be vague unless the points are brought out by illustration. Fig. 1 is a section through a valve of a cylinder. The precise difference, or difference in principal of design, between the cylinder shown in Fig. 1 and cylinders which do not perform so well in service may be noted by referring to Fig. 2, and comparing it with Fig. 1.

Referring to Fig. 1, attention is called to the uniform thicknesses of walls and to the avoidance of fillets which gather metal at intersections of walls. But these points are uppermost in the mind of the average designer when he undertakes a task of cylinder designing. If he fails to realize uniformity of section within narrow limits the fault lies between the pattern maker and the foundryman. However, there are points of design which the average designer prefers to evade. To begin with, the design principles of Fig. 1 evade all diagram effects; the walls at the respective points are anything but parallel to each other, excepting the walls of the bore of the cylinder, parallelism is unavoidable in this situation. Following the lines of the section, Fig. 1, attention is called to the bulges at B1, B2, B3, B4 and B5. In satisfaction of the same principles the walls are flared at F2 and F3. Again, the section through A-B which is not illustrated is elliptical; just enough so to depart from parallelism. A little further observation shows a valve with a stout stem S2, with a big fillet F1, joining the stem to the head. The 45-degree seat S1 is slight; the pressure per unit area of the metal of the seat is considerable.

The mass of metal in the head of the valve is great in comparison with the flame-swept surface of the same. The idea is to conduct the heat away by the stem to the water in the jacket, limiting the increase in temperature of the head to the minimum. The water in the jacket surrounds the stem at C1 and C2, and it reaches S2, half way around the stem at C 3, Fig. 1. The stem is shown without a separate bushing for the guide.

The idea is to avoid the poor heat conductivity of a joint, as between the bushing and the bore in the cylinder metal. The valve is made of the purest steel, or, better yet, iron, possible to procure by any process, it being the expectation, founded upon research, that pure iron is the best possible conductor of heat, and impure steel is in the reverse direction. The seat of the valve is cemented or case hardened to afford great hardness, not so much due to any demand for hardness beyond that afforded by nearly pure iron, but in order to realize the polish which is assured when an otherwise pure iron is nearly satuated with carbon. Before case hardening, the valve is copper plated, excepting the seat surfaces, the idea being to prevent hardening penetrating excepting at the seat. However, any observations respecting the valves used must be taken with a grain of salt; this is on account of a wide variation of valve practice. Heat is prevented from annealing the valve spring S1 by using a thin saucer 2, which serves its purpose because of the poor heat conductivity of the joint J1 and also due to the large amount of surface of the disk in comparison with its mass. The cylinder walls W1 are about 6 millimeters thick in cylinders of the largest bore in use, and the port and jacket walls are slightly thinner, ranging between 4 and 5 millimeters.

In this particular example of cylinder the diameter A of the port is slightly more than the diameter B of the same port. This choke of the port referring to the exhaust port is not general practice. A very limited number of mostly French engineers seem to give a choke to the exhaust. It is a practice which originated in gunnery. At all events fouling of the combustion chamber due to re-entering products of combustion or visiting products from adjacent cylinders, is avoided if a choke is introduced. The gases are compacted as it traverses the length of the choke, and, like the tail of a comet, they scatter again, but in the case of the motor not before they pass to the muffler. They are beyond doing harm by the time they reach the muffler.

Returning to Fig. 2, remembering that it is of value in a comparative sense, corresponding letters of reference are used, and instead of avoiding diaphragm effects they enter at every point of surfaces in juxtaposition. Instead of bulges B1, B2, B3, B4 and B5, as shown in Fig. 1, the only bulges used in the design Fig. 2 are for the dome B5 and the jacket above the dome B4. Instead of flares F2 and F3, as in Fig. 1, flat surfaces F2 and F3 are used in Fig. 2. Instead of a choke due to the difference of A and B in the port, see Fig. 1, A and B dimensions are identical in Fig. 2. The result is, outside of any advantage due to choke, that the walls are again parallel to each other and the principle which dictates flares and bulges is again defeated.

Non-Preferred Cylinder Jacket Design

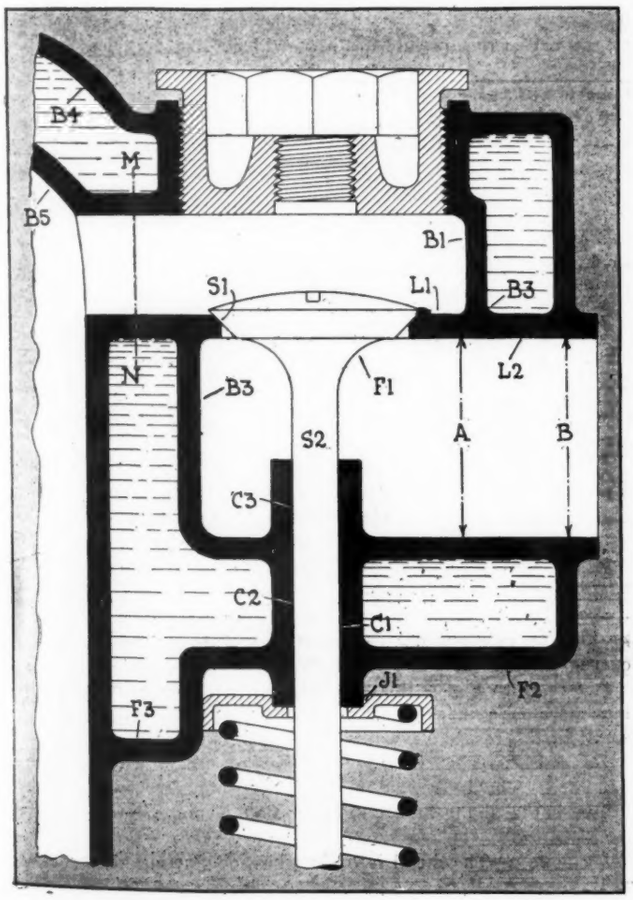


Fig. 2—Section of a conventional design of cylinder with parallel walls and a poor condition of cooling around the valve-seat metal as compared with that in Fig. 1

Cooling the Valve Stem

Fig. 2 differs from Fig. 1 also in the way the valve stem is cooled. The section M-N is rectangular instead of elliptical, and, looking at Fig. 1, the position of the valve seat wall L1 is well above the wall L2 of the port, whereas in Fig. 2 the two walls L1 and L2 are in the same place, one being a continuation of the other. The result is that in Fig. 2 proper cooling C4 of the valve seat and metal surrounding the seat is impossible. Not a few French motors develop cracks and fissures of the valve seat on this account. Nor is this type of trouble confined to French motors. In other respects there is a certain similarity between Figs. 1 and 2.

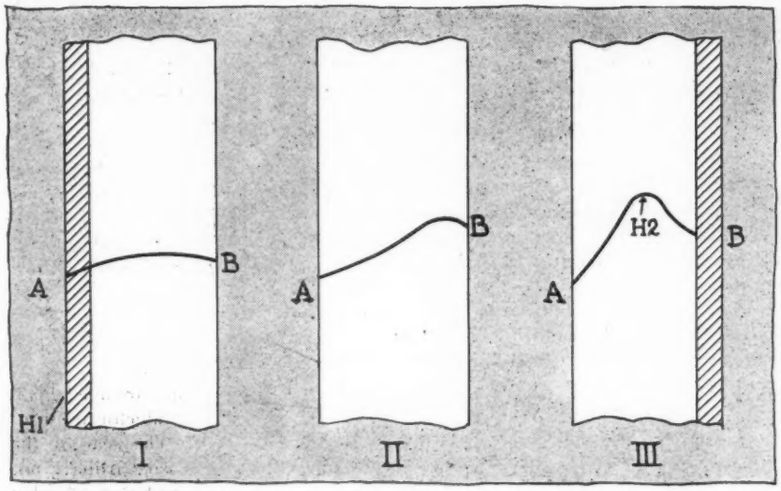


Fig. 3—A thick cylinder wall, showing how heat piles up, either in the mass of metal or in the crust and scale formed on the surfaces

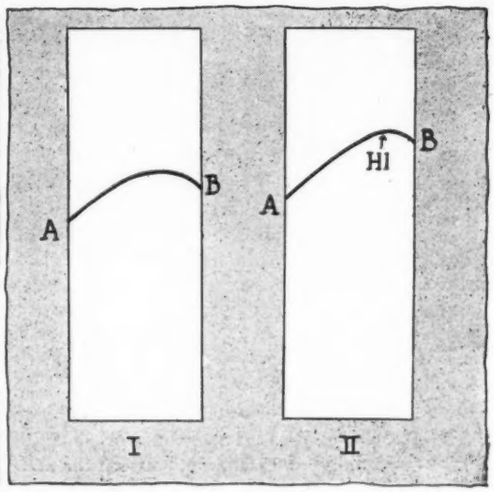


Fig. 4—Presenting three conditions of a thin cylinder wall in order to show how pre-ignition takes place

There are two prime reasons why stationary internal combustion motors deliver much less power per cubic inch of piston displacement than automobile motors. The most important of these reasons is that the cylinder walls of stationary motors are so thick that heat cannot pass through the section of metal as fast as it penetrates the flame-swept surface of that metal. The second reason is that the heat conductivity of the metal used is relatively very low. Of course, were stationary motor cylinders properly designed and were more power to be realized as a sequence, the inertia forces in these designs attending considerable speed increases would exert themselves and trouble would come from this quarter. But our story lies in the automobile field. From what has been said it must be concluded that wall thickness is a factor, but the ability of the metal to conduct heat is also of primal importance. The amount of heat that will have to be absorbed by the cooling water in the jacket can never be more than the number of heat units which will penetrate the flame-swept and contiguous surfaces in the time afforded in each case. *To limit the area of the flame-swept surface, then, is the first care of the designer. This point is given great attention, especially in Germany, but it does not go begging in any of the European haunts of the designer.*

All the heat which gets through the flame-swept surface, unless it makes its exit without loss of time through adjacent surfaces, will heat up or raise the temperature of the metal of the wall. If the wall is thick the time required for the heat to travel from face to face will be great. If the metal is of low heat conductivity, the amount of heat in heat units per unit of sectional area and per unit of time for a given difference in temperature between surfaces will be accordingly low.

Work Europe Is Doing

These points are being given fair attention in Europe, and the work already done is showing up in the better performance of the motors. It has been repeatedly shown that hot motors that pre-ignite because the cylinders get too hot are largely due to overheating of the metal, either because the cylinder walls are too thick or on account of scale, which, residing on the flame-swept surfaces, has its temperature raised to the glow point, when it serves as an igniter, or that cannot be timed; or scale which resides on the water-swept surfaces, preventing the heat from escaping to the water. But some motors heat when they are clean and even in the face of the fact that the cylinder walls are thin. In such examples it will doubtless be found that the metal of the cylinders is of very low heat-conducting powers. Figs. 3, 4 and 5 will serve to indicate the characteristic of the heat wave in cylinder walls, suggesting the distortions of the heat wave for the different conditions met with in practice.

In Fig. 3 the cylinder wall is represented as thick, as in stationary motor or inferior automobile motor practice, with conditions as follows:

Example 1—A deposit of scale, carbon, silicon and oil residuum, inside of the cylinder is shown as sectioning. The heat wave W1 rises from A, ending at B. Pre-ignition will be due to excessive heat at H4.

Example 2—The walls are represented as devoid of any scale inside or out. Pre-ignition will be due to the re-entering of the high heat shown at H3 of the curve W2; at the higher speeds of the motor this re-entering heat will be considerable.

The curve W2 shows the characteristic of the wave at customary working speeds of stationary motors.

Example 3 presents a condition of deposit on the exterior surfaces of the wall. The heat wave W3 starts at A2, reaches maximum at H2, which is the pre-ignition point, and the motor quickly shows distress.

Example 4 presents a state of deposit on the exterior and scale on the flame-swept surfaces of the cylinder wall. The heat wave 2A and 2B is almost flat; pre-ignition is due to glowing of the inner scale at H1.

Referring to Fig. 4, the cylinder wall is represented as thin—good automobile practice.

Example 1—The scale is within the cylinder. The heat wave A to B is but slight. Trouble follows at high speeds or under heavy loading of the motor and reduced speeds, due to glowing of the scale at H1.

Example 2—The walls are shown devoid of scale or deposit. The heat wave entering at a raiser to maximum just before the exit takes place at B. The performance of the motor should be good.

Example 3—Deposit is shown outside—over the water-swept surfaces. Pre-ignition follows high speed or heavy loading at reduced speeds taking place at H2 in the curve. Reaction of heat stored in the metal, as shown by the upward sweep of the curve A, B, is responsible for the trouble.

Referring to Fig. 5, this is a case showing thin cylinder walls, but there is a marked difference in heat conductivity of the metal in the respective walls to consider.

Example 1—This is representative of metal of high conductivity. The heat wave A to B, even at very high speeds, shows but a slight hump. Pre-ignition is not eminent in this example.

Example 2—The metal is of low heat-conducting ability. The heat wave A, B sweeps upward, bringing pre-ignition at H1. Increasing speed or heavy loading at reduced speeds aggravates this type of trouble.

The automobile engineer requires strong, pure gray iron for cylinders. The walls must be thin in order that heat may not

be stored up in the section or body of the metal. The mixture must be strong in order that thin walls will sustain under the forces offered in service. The heat conductivity of the metal must be high. To realize high-heat conductivity, it is necessary to use pure (as nearly as possible) metal, it being true of iron, and steel also, that the purer it is the greater is the heat conductivity. But it is feared that the average foundry is ill fitted to cope with this considerable problem, and yet, in Europe, just this phase of the cylinder-casting problem gets its measure of laboratory attention. But this is not to say that all of the countries in Europe are doing so well; indeed, not a few of them are content to just turn out castings.

American Castings Are Strongest

Analysis on numerous occasions discloses a big difference in the chemical composition of cylinder castings from the several sources of supply. As a rule American-made cylinders are stronger than the imported products. When the American foundryman discovers that his castings are the strongest, he puffs up. Were he told that the heat conductivity of his metal is too low to use, his state of mind would become so dazed that no amount of persuasion would have any further effect upon him. Referring to the average American foundryman, to be sure, it may not be out of place to say that foreign foundries deliberately sacrifice tensile strength to get heat conductivity of metal. It may come as an incident, but these purer castings are free from internal strains to a marked degree, so that the actual available strength of the finished product is greater than in the other case of castings showing maximum tensile strength.

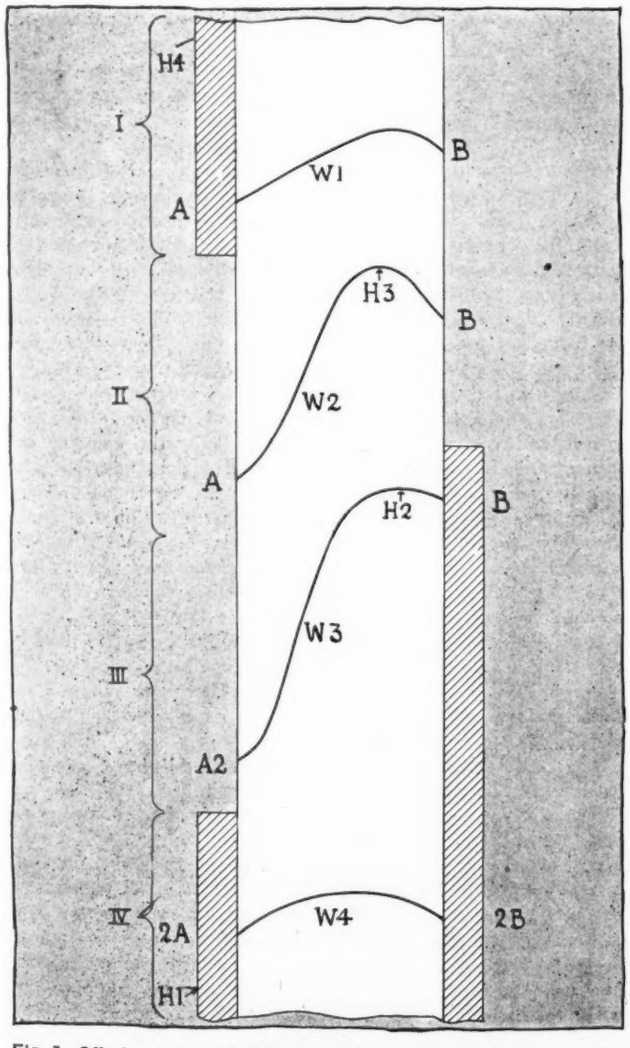


Fig. 5—Offering two conditions of a thick cylinder wall, showing the heating effect with metal of both good and bad heat conductivity

Reverting to Fig. 1, remembering that the walls of the parts and jacketing are flared and bulged in the manner before alluded to, it is the purpose now to point out wherein this practice helps the foundryman. The fact that a test proof of cast iron shows a tensile strength of 25,000 pounds per square inch, or even 28,000 pounds, is no assurance at all that the iron lodging in an actual cylinder will have the same available tensile strength. If the internal residual strains amount to, say, 10,000 pounds per square inch, this value must be deducted from the initial strength to derive the available strength. In order to coax the internal strains to subside, it is the idea of the German designer to avoid parallelism of walls in juxtaposition and to substitute a series of curves, bulges and flares, so interrelated as to afford a sufficient give to the metal as to relieve the internal strains. It is not unreasonable to expect that this plan affords compensations greatly in excess of the equivalent of 10,000 pounds per square inch of initial tensile strength of metal. Under these circumstances, if purer iron offering a higher heat conductivity, even with a considerably lowered initial tensile strength, is actually used, the gain will be two-fold: First, the available tensile strength will be higher, and, second, the motor will not overheat.

A CORRESPONDENT to *The Motor*, England, states that during the last few years when automobile racing has demanded the necessity of an engine that will give an extraordinary power relative to its size, designers have been faced with the question, "Are we, in designing an engine for general use to be influenced by the results of freak machine performances?"

There are cars on the market today, the correspondent goes on to state, with the stroke of the engine the same as the bore, and also with the stroke double the bore. The makers of each car state why their machine is superior to those of their competitors. Each is satisfied and each sells cars.

Let us look at it from the theoretical point of view.

Two cases must be considered, namely, the best diameter of the cylinder and the best length of stroke corresponding, taking into account the minimum weight per horsepower and high efficiency.

We know the power of a cylinder increases with the square of the diameter, and that, approximately, the weight increases with the cube. Therefore, the smaller the cylinder, the greater the indicated horsepower per pound. Considering then the small weight of a small cylinder, the necessary power must be derived from other sources than the bore-size if the engine is to be compact. The only possible means available is to increase the compression by employing a long stroke. And this not only increases the power, but increases the efficiency. These two, by the way, are not the same thing, for an engine may be powerful yet not efficient. The thermal efficiency of an engine is:

$$\frac{\text{Heat converted into work}}{\text{Heat available}} \times 100$$

or the ratio of the heat converted into work to the heat available.

The increase of compression naturally brings about a higher temperature of the compressed gas, which in turn naturally aids the efficiency of the engine by rendering itself more easily ignited. If then all this is true, the longer stroke we get, the more efficient and powerful engine will be the result.

Now, take the other side of the practical point of view. Two engines of 3-inch bore are made, but whereas one has a stroke of 3 1-2 inches, the other has a stroke of 5 inches. Run them both at 2,500 revolutions per minute and see which runs the smoother and more evenly of the two. And after constant use see which one has worn its big end crankshaft bearing away most.

As far as one can gather, the car that is required nowadays is one that will run from 5 to 50 miles an hour on high gear, and be efficient as a good car should be.

Tire Repairing Shop Cost Keeping Systems

Used Labor and Material Records Are Beginning to Enter Establishments Where Casings and Tubes Are Overhauled for Service

FEW tire repairmen recognize the value of cost-keeping systems at this day. This accounts for the fact that only a small percentage of them have adopted them and that, where systems have been introduced, they are very simple, though sufficient for the needs. Most shops do not keep records continually of the cost of every individual job, but the progressive among them do so until they arrive at a fair standard cost of a repair job, or, rather, of the various kinds of jobs handled in the shop. After this, the detailed cost-keeping system on every job is reduced to a more lenient process, consisting but in the time-checking of the men, this being carried on for reasons of policy, as one of the most successful tire repairmen of New York remarked.

Repair systems in tire shops are somewhat similar to those used in recording costs in an automobile repair department. They comprise two or three blanks, a receipt to the customer who brings in a tire to be repaired, an order specifying the work to be done on the tire accompanying the same to the shop and a time card, on which the men doing the work enter the time spent on each job. Clock cards for stamping time in and out of the workmen are also used in many shops. Furthermore, some companies keep a record of the materials used every day, itemizing it by the numbers of the jobs on which they are used. An inspection of a number of shops, however, indicates that records of material are kept by few of the shop managements. The reason therefore is that it is rather a difficult matter to measure and note the small quantities of vulcanized and unvulcanized Para rubber, cotton strips, cement, etc. The opinion seems to be that the continued recording of every small quantity of material used in the shop is too formidable to be carried on. Despite this, modern shop managers who recognize the value of cost standards, do conduct such records, at least for some time, when it is possible to formulate standards of actual material costs. The unit cost of material of each particular type of repair having been fixed, it is an easy matter to find out at the end of the week whether these standards have been kept up or not, or if they have been raised, without continuing individual material-cost records for every job done in the shop.

The records are in all cases kept by shop workers and office force combined. The adjuster or his clerk fills out the first card or slip which serves as receipt to the customer and as a work order, while the records of labor spent on each job are filled in on the cards by the men doing the work. The correctness of these records is checked by continued inspection of the shop work, this supervision being carried out by the foreman of the shop. In this way, as well as by the sparse use of used materials records, the personal equation is permitted to enter into tire repair work to an extent far exceeding that influencing ordinary automobile repairs. It is a simple fact, easily reasoned out and easily proven, that the lack of system due to the discomforts arising from its use in this particular field is a detriment to the commercial success of a tire repair enterprise. There is no doubt that where complete all-around records are inforced, the economy of the shop operations may be increased to no small extent.

The leading tire repair establishments of New York City have used cost-keeping systems for a number of months, and, after some experimenting with the types of forms put to use in this connection, a good many have arrived at what they consider to be final standards of system blanks. At any rate, the forms now in use are almost without exception very simple and well adapted to their purpose, being as few as possible and yet giving the office and the shop workers a chance to record all essential data on tire repairing.

E. SCHOONMAKER CO.

No. 7 Date 10/3/12

Name John Jones

JOB NO.	CUSTOMER	START	FINISH	TIME	AMOUNT
6840	Albutson G.	8.15	9.00	3/4	.37
41	J. Gaischard.	1.20	3.05	13/4	.87
42					

Fig. 1—Time distribution card used by the repair workers in Schoonmaker Company's shop

Description of Firestone System

Two representative systems which contain every feature of cost-keeping and repair recording used in New York tire overhauling shops are described below. They are used by the Firestone company's metropolitan branch and by the E. Schoonmaker Company, one of the leading tire repair shop operators of the city. The Firestone concern uses one card, Fig. 2, printed black on yellow cardboard. The card is 3 1-3 by 8 1-2 inches and consists of three sections which serve as work order, customer's receipt and receiving slip. When the tire is received by the adjuster who is in charge of the firm's repair department, the card, Fig. 2, is filled out. The date of receipt, name of customer, size of tire and the work to be done on it, and what other particulars are essential and may be seen by referring to the illustration, are entered on the card, which is then separated in its three sections by tearing the perforations. The middle section, the so-called claim check, goes to the customer and is later exchanged against the repaired tire, casing or tube. The receiving slip is kept by the adjuster until the repair has been completed, after which it is filed away under the name of the customer, names being, of course, arranged alphabetically. The bottom section goes to the repair shop with the casing or tube. There the time spent by the men is recorded on the form, specifying the periods spent on cutting, buffing, cementing, vulcanizing, etc. The Firestone company does not specify the names of the men who do these operations, as the shop has been so organized that each man does but one class of work. It is for the same reason that no time-distribution cards are used in this shop, for, while the men stamp their time in and out, the way it is used is obvious upon examining the repair cards. Furthermore, the company relies to a great extent on the foreman to keep his men busy at all times.

The repair being completed, the tire and the disposition records, as the company calls the bottom section of the card, are returned to the adjuster's office, who directs the bookkeeper to make out a bill which, together with the tire, is given to the customer in exchange for the claim check. Naturally, some customers are required to pay cash for their jobs. The bookkeeper enters the work in the ledger, whose records serve as the basis for monthly statements, so that the three sections of the cards are not required by the company after the tire has been delivered to the owner. But to avoid any possible complication, which might arise in the future, the three sections are filed away together under the name of the customer.

A system different in its details is the one used by the Schoon-

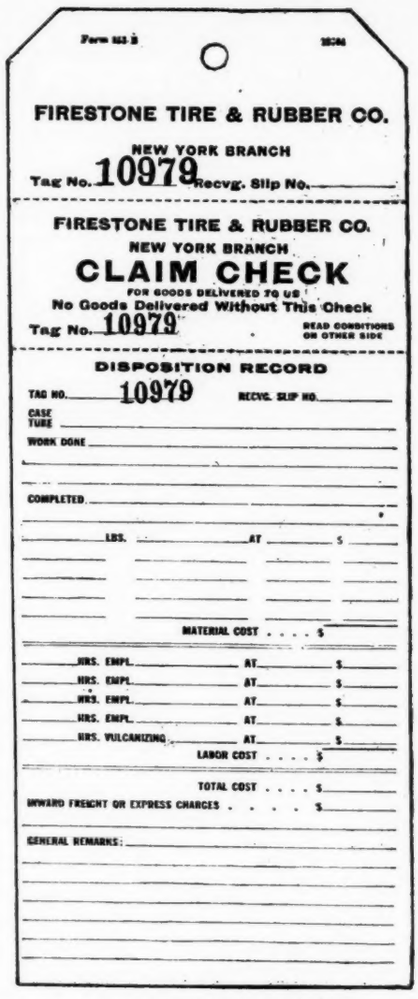
maker company. It consists of three forms, one of which is designed similar to the one of the Firestone company, the second as a worker's time-distribution card and the third as a material record. The clock card is also used in this shop.

Fig. 3 shows the first-mentioned blank which also consists of three sections, with perforations between them, representing customer's receipt, shop order and office record. The process of using these blanks is identical with the one prevalent in the Firestone repair department. The worker's time-distribution card, Fig. 1, is a simple but efficient design and gives the office of the company all the information which may be desired with reference to the repair work done by each man employed in the shop. Every time-distribution order is marked with the number of the workman, his name and the date on which the card is used. In the lower portion of the form he enters the number of the repair job which appears printed on the work order, the name of the customer for whom the work is done, the make of tire upon which he works and, finally, the nature and quantity of the material used in connection with every repair job. The material records are kept in the form of a large book or ledger, and every workman is required to enter all the material in this book, which is kept in the office of the shop foreman. Exactness of the material records is a condition, the importance of which is impressed on all the men, while the distribution of their time is not checked except by the general inspection work of the foreman, no time-clock mechanism being employed. The reason for this course is stated to be due to the many small jobs done in the shop and the consequent loss of time which would be incurred by the men running to a time-clock every few minutes. The superintendent of the Schoonmaker company, however, was emphatic in stating that, in his establishment, standard costs of repair operations have been arrived at long ago, so that from the workman's time-distribution card it becomes fairly clear whether the man wasted any time or not.

Practical Value of a System

It should be remembered that the arrival of standards of cost for all operations done in a shop are the purpose of all cost-keeping systems. These records again form a basis for many improvements, as, if it is once found that the men use on the average, say, 1 hour for a job which could be done in 45 minutes, the course which should be taken can be made clear to the foreman. It is his business to see that the time consumed on a given job should be reduced from the actual, present standard to the ideal one; it is, furthermore, his business to devise ways and means as to how to do this. The effect of such a course is that the unit cost of the work done in the shop is reduced in proportion to the time consumed, so that with the same force a larger volume of business may be handled, which will naturally flow to the establishment if a little of the saving in labor cost is used for reducing the retail price of the repair jobs. This being essentially equal to an *increased supply of repair work* caters to an increased demand, if the price is slightly lowered to invite a larger number of customers.

It has been the curse of the repair business, automobile and tire trade as well, that the operators have either thought that there is no chance to make money in their business or that they used it to exploit their customers without any remorse. Only lately these branches of the automobile business have been put upon a saner and, in the long run, more profitable basis. By and by repairmen began to see that their business is like others and that the same principles of work and trade policy must, as elsewhere, be applied if a lasting success is preferred to a spontaneous inflow of cash.



FIRESTONE TIRE & RUBBER CO.
NEW YORK BRANCH
Tag No. 10979 Recvg. Slip No.

FIRESTONE TIRE & RUBBER CO.
NEW YORK BRANCH
CLAIM CHECK
FOR GOODS DELIVERED TO US
No Goods Delivered Without This Check
Tag No. 10979
READ CONDITIONS ON OTHER SIDE

DISPOSITION RECORD
TAG NO. 10979 RECVG. SLIP NO.
CASE
TIRE
WORK DONE
COMPLETED
LBS. AT $
MATERIAL COST . . . . $
HRS. EMPL. AT $
HRS. EMPL. AT $
HRS. EMPL. AT $
HRS. EMPL. AT $
HRS. VULCANIZING AT $
LABOR COST . . . . $
TOTAL COST . . . . $
INWARD FREIGHT OR EXPRESS CHARGES . . . . $
GENERAL REMARKS:

Fig. 2—Firestone's repair form

No..... Date.....

E. SCHOONMAKER CO.
112 West 54th Street, New York

Owner.....
Address.....
Make.....Size.....
Repairs.....
.....
.....
.....

E. SCHOONMAKER CO.
112 West 54th St., New York
No.....
Name.....
Make.....Size.....

No..... Date.....
Name.....
.....
.....

E. SCHOONMAKER CO. No.....
Name.....
Address.....
.....
.....

Fig. 3—Combination of owner's receipt, work order and office record used in the tire repair shop of E. Schoonmaker Company

Accelerometer—Its Use and Value

Rate of Speed Increase Depends Upon Torque Continuity and Reduction Between Motor and Driving Wheels

Graphic Form Valuable in Examination of the Automobile's Accelerative Powers on a Time Basis

THE acceleration of any given motor car at any moment depends primarily upon two factors—1, the engine torque; 2, the gear ratio in use. The former is governed by the total cubic capacity of the cylinders of the engine, and the latter by the gear-box ratio corresponding to the gear in use at the moment. The proportionality of torque to cylinder volume is based upon the experimentally ascertained fact that the mean pressure is not appreciably affected by cylinder dimensions in any four-stroke petrol engine as usually built. Given this constancy of mean pressure, it follows that the mean torque must depend upon the product of cylinder area by crank throw, that is upon D^2L, the cylinder displacement. An interesting corollary to this is the deduction that for any given gear ratio on a given car the car speed and the brake horsepower will be identical for all engines of equal volume which may be fitted to the car.

A graphical construction affords the readiest way of tracing the relationship between acceleration, torque and gear ratio. Thus in Fig. 1, A B is the torque curve on top gear, C D the torque curve on second gear, and E F that on bottom gear (taking the case of a three-gear car). These torque curves are plotted with car speed horizontally and pounds per ton of equivalent tractive effort vertically. A definition of the vertical co-ordinate would be that it is the number of pounds of tractive effort per ton weight of vehicle at the road wheels equivalent to the engine torque at that speed. On the same diagram, and to precisely the same scale, it is possible to plot the curve G H, representing at each speed the total resistance to motion, including the friction of any internal gearing between the clutch and the road wheels.

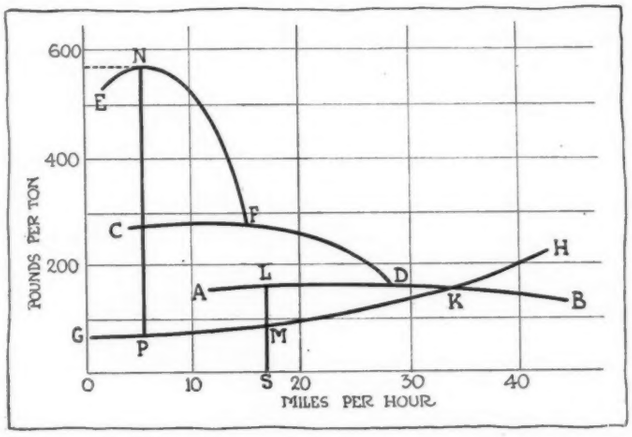


Fig. 1—Diagram of automobile torque and resistance curves

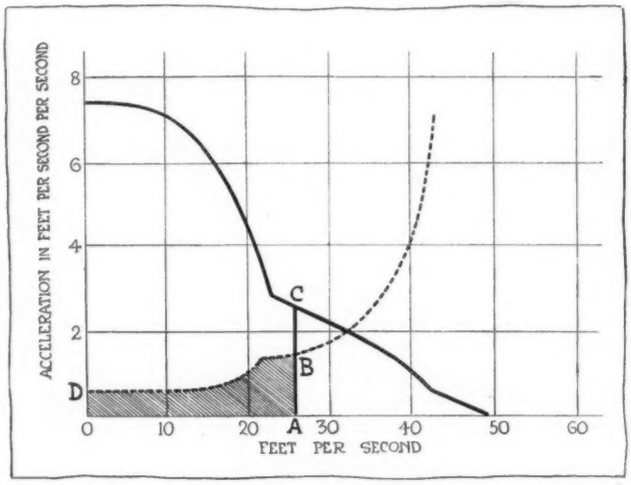


Fig. 2—Method of predicting the acceleration-time graph

Now, at the point K two of these curves cross, showing that at that point the tractive effort due to the engine is exactly balanced by the resistance to motion. This point therefore gives the speed—some 32 miles per hour—at which the car would travel with throttle open on a level road. The effect of climbing a gradient is to increase the resistance to motion by an amount proportional to the gradient, and the resistance curve G H rises, keeping parallel to itself, by this amount, so that the point K moves in to the left, showing that the steady speed will be less. At the speed O S the resistance is only M S, whereas the engine effort is equal to L S; the excess force L M produces acceleration if the road be level, or a combination of accelerations and hill-climbing ability if the road be rising. When the road is level the whole of M produces acceleration, and the amount of that acceleration can be directly scaled off by the length of L M (1 foot per second is very nearly equivalent to 70 pounds per ton).

The relationship between the three torque curves shown in Fig. 1 is very simple. A B is the torque curve on top gear plotted directly from a bench test diagram. C D is the same curve compressed horizontally and expanded vertically. The ratio of this compression and expansion is the ratio of the engine revolutions per minute at any given car speed when on top gear to the engine revolutions per minute at the same car speed when on second gear. It will be readily seen that coresponding points on the torque curves will lie on the same rectangular hyperbola, and this gives an easy graphical construction for drawing the curves E F and C D when A B is given and the gear ratios of each gear are known. The rectangular hyperbola which just touches each of these curves touches them at the points of maximum horsepower.

Each of the torque curves thus obtained requires, properly, its own resistance curve, since the frictional loss between clutch and road wheels will depend upon which of the gear wheel combinations in the gearbox is in use—most of the gearbox friction arises from the churning up of the grease or oil in use, is not sensitive to the amount of torque transmitted, but rises rapidly with speed. There should, therefore, be three resistance curves, each a little higher than the last. But it is found to be far simpler to keep to the one resistance curve and to lower the curves E F and C D by the amount of this extra friction. This convention greatly simplifies the diagram. Thus, on bottom gear the maximum possible acceleration can be directly scaled from the length N P. In this manner it is possible to predict the acceleration on each gear at any car speed, and from the figures so obtained to make a graph of predicted acceleration on a car speed base.

When such a graph has been obtained it is sometimes desired to convert it into one based on time instead of on car speed. To do this we must plot on the car speed base the reciprocal of the acceleration and measure the area between this curve and the horizontal axis; these areas will give the time in seconds corresponding to each acceleration value, and the acceleration and time graph can then be constructed. The exactitude of this procedure follows from the relationships

$$\int \frac{1}{a} \cdot dv = \int \frac{dv}{\frac{dv}{dt}} = \int dt$$

The curves in Fig. 1 have been drawn to represent to scale the case of a 15-horse-

*Paper read before the British Association at Dundee by Mr. H. E. Wimperis, M.A., inventor of the Wimperis accelerometer.

power (R. A. C. rating) touring car with hood and screen in use. From this we will proceed to predict the acceleration-time graph. The first difficulty that arises lies in the fact that the car does not start with the engine in gear and the curve E N F does not meet the vertical axis. For reasons explained later this is met by drawing the dotted line T N and treating it as a part of the bottom gear torque curve. The acceleration speed graph shown by the firm line in Fig. 2 is obtained from Fig. 1 by direct scaling, as already explained. The dotted curve gives the reciprocal of the acceleration, and the shaded area measures the time taken from rest to attain an acceleration equal to A C. The acceleration-time graph thus predicted is shown in Figs. 3 and 4, allowing an interval of one second to effect the gear changes from bottom to second and from second to top. The distinction between Figs. 3 and 4 is that in the former the driver is assumed to change gear at 2,000 revolutions per minute and in the latter at 1,600 revolutions per minute; also that in the former the gearbox friction has not been allowed for, while in the second it has. It will be seen from Fig. 2 that the maximum possible acceleration is about 1.1 foot per second per second on top gear, 3.0 feet per second per second on second gear, and 7.0 feet per second per second on bottom gear.

Experimental Measurements—The above is a simple method of predicting the acceleration of a motor car; it remains to describe how this acceleration can be experimentally measured, and then to compare the curves given by experiment with Figs. 3 and 4.

Two methods are in use for the measurement of the car acceleration: 1, by deduction for a space-time graph; 2, by the direct indications of an accelerometer. Of these two methods the former has the attraction that none of the measuring apparatus is carried on the moving vehicle. It is, moreover, a simple matter to measure the distance traveled at the end of equal time intervals; the slope of this space-time graph at any point measures the velocity, and a velocity-time curve can then be constructed. And the slope at any point of this velocity-time curve measures the acceleration. This process is, however, both long and inaccurate, particularly at the gear change points. The same data could have been treated equally well by an analytical process based on the calculus of finite differences; such a method has been used at Brooklands, but it suffers from the alternative disadvantages that, if a large number of terms in the infinite series (given by the method of the calculus) be taken, the process is exceedingly laborious, and that if few are taken the method fails in accuracy, particularly when the acceleration is changing rapidly. It is far more difficult to measure the acceleration of a car than of any other vehicle, owing to the discontinuity of motion in the gear changing.

The use of an accelerometer avoids these lengthy and troublesome calculations, but has certain disadvantages peculiar to itself. It is open to the objection that the measuring instrument is carried on the moving vehicle, and is therefore subjected to a good deal of vibration, and possibly to zero-error should the floor of the car change appreciably in its upward or downward tilt relative to the road. Vibration gives little trouble in a suitably designed instrument, and is actually useful in that it helps to overcome any statical friction there may be in the mechanism. The difficulty due to change of tilt cannot, however, be avoided by any attention to the mechanism of the accelerometer. But its amount has been the subject of careful study on a variety of cars, and been found to be less than can be measured in practice; were it otherwise, it would be necessary to take the precaution of first blocking the car springs.

Acceleration tests were made with one of the recording accelerometers above mentioned on the car for which Figs. 3 and 4 were predicted. The results are shown in Figs. 5 and 6. The former was taken on Brooklands track, when the driver was instructed to accelerate as rapidly as possible, and the latter on the road on the way to Brooklands without the driver knowing that any test was in progress. In both cases the road was pretty nearly level, rising about 1 in 80 in the case of Fig. 5, and falling about 1 in 100 in the case of Fig. 6. There is a striking difference between the test and non-test starts, and the latter was, of course, much the more comfortable for the passengers, the rate of change of acceleration being far less.

It is interesting to compare the prediction and the reality. On second and on top gears the predicted acceleration agrees very nearly with the actual figures, but on bottom gear the reality is some 2 feet per second per second, or about 30 per cent. below the prediction. Now, the following are factors which all influence acceleration, particularly when on bottom gear as the car starts from rest.

a—The momentum stored in the rapidly rotating flywheel is suddenly liberated when the clutch is let in.

b—The carbureter is liable to choke with the rapid change in engine output.

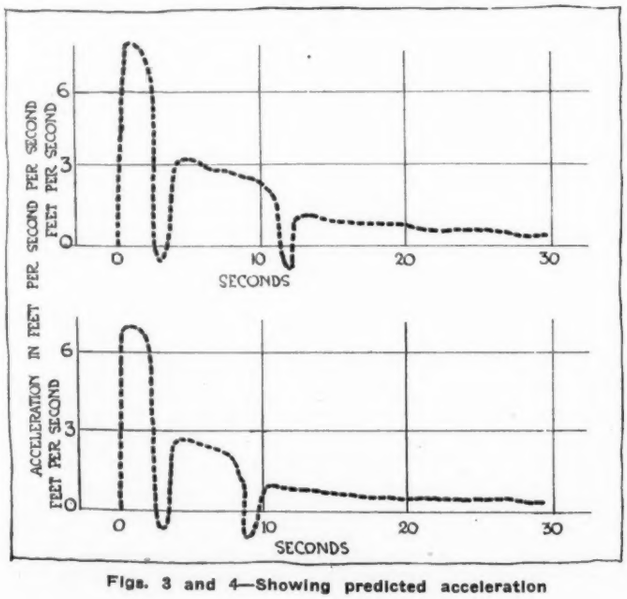
c—during the engagement of the clutch the engine is exerting torque.

d—The road wheels are liable to slip.

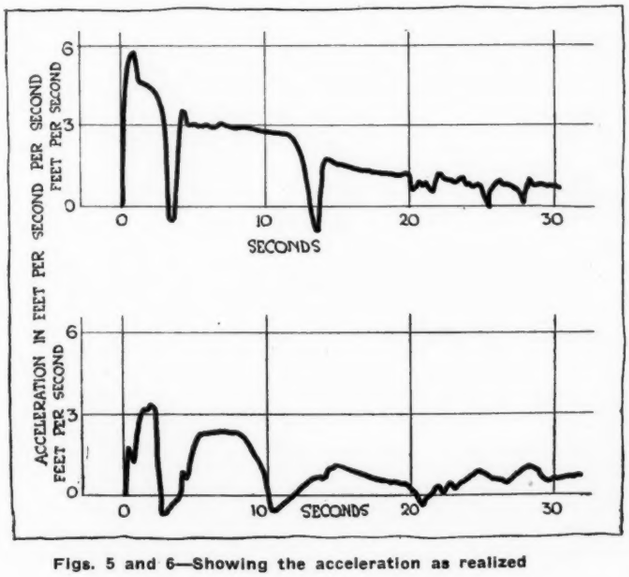
e—The momentum given to the car is partly absorbed in giving momentum to the rotating parts.

As regards *a*, the momentum stored in the flywheel of this car was 1 1-2 per cent. of that stored in the car when the top gear was in. Before starting the driver may spin his engine and flywheel at a rate—say, 2,000 revolutions per minute—equal to that equivalent to running 40 miles per hour on top gear. And if this momentum be given to the car, it will produce in it a speed of 1 1-2 per cent. of 40 miles per hour—or 0.6 miles per hour—corresponding to about 1 foot per second per second if the operation were completed in just 1 second. During the same time interval, whatever it may be, the engine is also exerting torque and this *c* is a further reason why the starting acceleration should exceed the predicted value. It is difficult to assess the engine torque during the clutch engagement when the engine speed falls rapidly from 2,000 revolutions per minute to only a few hundreds. In the limiting case we may take the torque during this brief interval as equal to the maximum torque on that speed, and draw the dotted line T N shown in Fig. 1. Cause *b* has probably—with *d*—much the most important influence on the acceleration—enough influence, in fact, to neutralize the factors tending to make the predicted acceleration higher than the true and to reduce the actual substantially below the prediction, for it is not to be expected that when the load on the engine is changing so rapidly as it does during the starting of the car that the carbureter will be able to supply fuel exactly proportional to the load, as it undoubtedly does in a good engine when running on

(*Continued on page 740.*)



Figs. 3 and 4—Showing predicted acceleration



Figs. 5 and 6—Showing the acceleration as realized

Electric Lighting System Requirements

Dynamo Should Be Geared to Give Full Output at a Speed of 15 to 18 Miles Per Hour

Design of Lamp Reflector a Potent Factor in Determining Illuminating Efficiency

IN determining the necessary qualifications for a dynamo lighting system for any particular use, the following points immediately become of importance:

1—The lamps to be used.

2—The dynamo output needed.

3—The dynamo speed and the method of driving the dynamo.

4—The proper size storage battery to be used with the dynamo selected.

5—The type of wiring.

The most important of these is the first, that is, "What lamps to use." After determining the lamps to be used we immediately become of importance:
from this the other points can be readily deduced. There are only three size bulbs now in general use for headlight work, these being respectively 16, 21 and 25 candlepower.

For small motor cars, which travel at comparatively slow speed, and where the owner would be satisfied with light that while better than acetylene lights usually supplied with these small cars, is still not the most powerful, and where he will not be likely to compare his lights with those of friends who have higher power, to the detriment of the 16-candlepower lamps, 16 candlepower is undoubtedly ample.

On the higher-powered cars the 21-candlepower bulbs are in almost universal use to-day. These will give ample light for driving up to a speed of, say, 40 miles an hour at night, illuminating the road far enough ahead that any object may be observed in time to stop almost as well as in daylight; in fact, give all the light that is needed.

Such lamps when used with a shallow parabolic reflector will light a road 50 feet wide for the full width of the road from the front of the car to a point over a quarter of a mile away. A deep parabola of the same focus will light the road even further, but will not give as much light at the sides close to the car. Where extremely high-powered cars running at very high speed are used and where very large reflectors can be used, 25-candlepower bulbs are sometimes used.

It must be realized that with small reflectors built to take a 16-candlepower bulb the insertion of a 21-candlepower bulb will not give a proportionately larger amount of light on the road, and similarly a 25-candlepower bulb in a reflector built for 21 candlepower will not give sufficient additional light to warrant its use. **The reflector should be adapted to the particular size bulb used; for this reason there is little benefit in using large candlepower bulbs in small reflectors.** With a commercial reflector having the greatest diameter of 8 inches a 16-candlepower bulb is about all that can be focused economically. With one of 10 inches diameter a 21-candlepower bulb should be used, and there is little use in using a bulb larger than 21 candlepower except with a 12-inch reflector, which is very seldom seen on account of the large size.

We can therefore safely assume that the bulbs to be chosen for the headlights will be of 21 candlepower, these being almost universal for cars of over 25 horsepower to-day. The side lamps and rear lamps are for signaling only, and bulbs of small candlepower can be used. Four-candlepower or 2-candlepower bulbs are adequate. It is customary to use 4-candlepower side lights and 2-candlepower rear lights. The amount of current taken by these side and rear lights is so small that there is no objection to using 4-candlepower bulbs for all three or 2 candlepower for all three, but the desirability of having a brilliant light at the side, for appearance's sake, has led to the use of 4-candlepower bulbs. Frosting the bulbs in the side lights gives a very pleasing appearance, and I think will be very largely adopted in the near future.

In addition to the head, sides and rear, the car will probably be equipped with such current-consuming devices as a speedometer light and electric horn, very possibly a cigar lighter, a light in the tonneau or limousine, and similar lights. None of these lights, however, is used for a very long period of time, and in designing the balance of the system after having decided on the five main lamps it may be safely assumed that the overload capacity of the outfit will take care of these additional loads, which are run for a short time only.

We have therefore assumed that the lamp load on an ordinary car should be two 21-candlepower headlights, two 4-candlepower sidelights and a 2-candlepower rear light. The two headlights will take 7 amperes, the two side lights 1.7 amperes, the rear light .6 ampere, making a total lighting load of 9.3 amperes.

The second point we have to determine is the dynamo output needed. We have already assumed the light load to be 9.3 amperes. In order to make sure that we have ample overload capacity to take care of the many short loads made by the horn, speedometer light, etc., the dynamo should be capable of delivering to the storage batterly slightly more amperes than required by the lamp load. For this reason **an output of 10 amperes of the dynamo has been accepted almost universally as the proper amount when such a lighting equipment is used.** This will keep the storage battery always up to the best efficiency and at the same time it is small enough that the storage battery will not have to have too large plates in order to run without undue deterioration.

Dynamo Speed Needed

The dynamo should be so geared to the car as to give its full output at from 15 to 18 miles an hour, and any speed above this. At a speed lower than 15 to 18 miles an hour the car will not be driven for more than a very few miles with all the lights lighted, and the reserve capacity of the storage battery will more than make up for this short time. Of course, when the car is being driven in the city where the headlights are not being used, it often runs more slowly than this, but at these lower speeds the dynamo is generating a proportionately smaller amount and will give ample current to take care of the two side and rear lamp, which take only a total of about 2.3 amperes. A shunt-wound dynamo which will deliver 10 amperes at, say, 15 miles an hour will deliver 2.3 amperes at 8 to 9 miles an hour, so that whenever the car is running it will supply ample current for the side and rear lamps.

What shall be the ratio of speed between the dynamo and the engine, and what shall be the method of driving the dynamo? These two points are so interrelated that logically they should be considered together. The size, weight, and consequently, the cost of the dynamo, are determined not only by the ampere capacity, but also the speed at which the dynamo will deliver the stated ampere capacity into a 6-volt three-cell lead battery. I will not treat of the relative size, weight and cost of shunt, series, compound or magneto type of dynamos, but limit my statement to the fact that in dynamos of any one type the size, weight and cost are determined by the ampere capacity and the speed at which this number of amperes can be put into a three-cell lead battery.

The cost of a dynamo which will deliver 6 volts and 10 amperes at 1,500 revolutions per minute is 30 per cent less than of one which gives the same output at 1,000 revolutions per minute, and less than half the cost and of about half the weight of one designed for the same output at 500 revolutions per minute.

A shunt-wound dynamo designed to put 10 amperes into a three-cell battery at about 1,000 revolutions weighs approximately 21 pounds and can be made approximately 8 inches long by 5⅝ inches high by 4¾ inches wide. If we reduce the speed to 500 revolutions the weight becomes approximately 33 pounds and the dimensions approximately 9¼ inches by 7½ inches by 4¾ inches. This 1,000-revolution dynamo should be run at engine speed for the best results.

The question immediately comes up whether, as a matter of judgment, there is sufficient advantage in running at the lower speed to make up for the added weight and the added cost. It will be found in general that where a shaft is provided on the engine to which the dynamo can be coupled, and this shaft runs at engine speed, the added weight and cost of the engine-speed dynamo are warranted, because the cost and complication of sprockets and chain for driving are eliminated. But where such a shaft would have to be put in the engine specially and driven by gears, or when some shaft already projecting runs at engine speed but is not so located that the dynamo could be directly coupled to it, and consequently either gears or sprockets and chain have to be used, there is little question but that a dynamo delivering its full

NOTE—From a paper by Leonard Kebler in the S. A. E. Bulletin for September.

output at 1,000 revolutions per minute and running at about twice engine speed is the happy mean in weight, cost and size.

A dynamo which will put 10 amperes into a three-cell battery at 1,000 revolutions, driven at twice engine speed on a car with 36-inch wheels, geared 3½ to 1 on the back axle, will start to charge the battery at from 6 to 7 miles an hour, and will give enough current to supply all the lamps, that is, about 10 amperes, at 15 miles per hour.

The same dynamo on a car geared 3 to 1 with 36-inch wheels, starts to charge the battery at 9 miles per hour, and will deliver enough current to take care of all the lamps at 18 miles per hour.

Such a dynamo I believe to be the ideal one where there is no provision made for driving directly at engine speed. A machine running at higher speed than this has not sufficient advantage in weight and cost to warrant the higher speed of the chain and the higher speed in revolutions per minute of the armature and the additional wear on the bearings and additional chance for noise. At the same time the use of a dynamo at less than twice engine speed to get a reduction in chain speed and wear on the bearings has not sufficient advantage to warrant the use of a larger, heavier dynamo running at, say, engine speed and driven by chain gears.

On a dynamo driven by ⅜-inch pitch silent chain at twice engine speed, sprockets of 30 and 15 teeth would be used. At 45 miles per hour this chain would run 1,500 feet per minute and at 60 miles per hour 2,000 feet per minute. These speeds are not excessive, but if a dynamo giving its output at 1,500 revolutions per minute were used running at three times engine speed, we would use 45 and 15-tooth sprockets and the chain speed would become 2,250 feet per minute at 45 miles per hour, and 3,000 at 60 miles per hour, which is too high for efficiency or long life. We may therefore decide not to run our dynamo at over two times engine speed.

On the other hand, where it is possible to drive at engine speed through an Oldham coupling the ideal case is undoubtedly reached, and in this case the additional weight and cost of the dynamo are warranted, as we save the cost of sprockets and chain and eliminate the necessity of oiling them, etc.

Method of Dynamo Driving

Having determined the lights to be used, the dynamo output, and the relative speed of the dynamo to the car, the next point to determine is the method of driving the dynamo. **A very useful method of driving the dynamo is to extend the pump-shaft through the pump, leaving an extension back of the pump to which the dynamo can be coupled directly by means of an Oldham coupling.**

In other cases it is possible to have the armature shaft of the dynamo extend through both ends and drive from the timing gears through the dynamo armature to the magneto, having the magneto and the dynamo lined up in tandem.

In each of these cases a dynamo running at engine speed is used for a four-cylinder car and one and one-half times engine speed for a six-cylinder machine.

When neither of these methods is possible, and it becomes necessary to drive the dynamo by gears or silent chains, we will then use the higher speed machine, running at about twice engine speed, and this can be driven in a number of different ways. Where the pump is driven separately from the magneto, it may be driven at twice engine speed and the dynamo can be run directly from the pump-shaft through an Oldham coupling. **Where a shaft running at twice engine speed can be installed projecting from the timing gear case or from the gearbox it can be driven by gears or chain running in oil, and then the dynamo can be directly coupled to the shaft. This gives a noiseless and almost wearless drive.**

A sprocket on the pumpshaft or magnetoshaft driving a sprocket on the dynamo by silent chain at twice engine speed is quiet, efficient and satisfactory. It is, of course, better if the chain can be enclosed and run in oil. Any one of these methods has been proven to be entirely satisfactory in practice, to have long life and to be quiet.

Size of Battery Needed

Having determined all the necessary features of the dynamo regarding output, speed and method of drive, we turn to the storage battery. The first thing to determine is the proper size to use with the dynamo selected. It must fulfill two conditions:

A. If the car owner runs entirely in the daytime the battery must have sufficient square inches of plate surface to be charged, whenever the engine is running, at the maximum dynamo amperes without injury to the battery.

B. If the car is standing still with all lights lighted, the battery capacity should be sufficient to keep all the lights burning for 6 hours; and when only the side and rear lights are on, it should be capable of keeping these lighted for, say, two nights, or 24 hours.

Considering A, experiment shows that a battery having 160 square inches of positive plate surface and 200 square inches of negative plate surface will not be injured by use with a dynamo giving 10 amperes output on an engine. Such a battery would undoubtedly be ruined if 10 amperes were put into it continually on the test bench, but the conditions in motor car service are so different as to require some comment.

There are two things that cause rapid deterioration of storage batteries when they are charged continuously at a high rate: The first is that the heating of the battery due to continuous charging softens the plates so that they become readily disintegrated. The second is that large bubbles of gas form on the negative plates, and when these bubbles break away from the plates they take particles of the active material, especially when this has become softened due to heating.

In motor car work, in the first place, it is very seldom that a battery is charged continuously at the maximum rate for more than two hours at a time. There are always stretches of a few minutes when the engine is slowed down, so that the dynamo does not deliver its full output, or when the engine is stopped entirely, and the battery has a chance to cool off. As a result the service is not at all analogous to tests made on a bench where the current is put into the battery continuously. On a test bench the battery would get hot, but on a car it will not. In fact, in a battery with the plate surface already decided upon there is little or no heating in ordinary service and no excessive heating in the most severe service. In the second place, the large air bubbles do not have a chance to form on motor car batteries, due to the jarring and jolting that a motor car gets in going over the road. Before the bubbles have time to become large enough for them to take off a serious amount of active material they are jolted loose and do not injure the plates to any material degree. As a result it will be found that storage batteries can be run at almost double the charging rate without undue deterioration on a motor car that they can when standing still on a bench. The mechanical agitator, now often used for large stationary batteries to keep bubbles from forming, is replaced by the jolting of a motor car, and the various methods of cooling often adopted for large stationary plants is taken care of in this case by the occasional slowing down and stopping of the engine.

On a motor car a battery is run under ideal conditions, because it is being constantly charged and discharged under ideal conditions as regards agitation and coolness. A battery having the plate surface mentioned above will light all the lamps, that is, discharge at a 9½ to 10-ampere rate for about 3¼ hours, and will light the side and rear lamps for 24 hours. Such a battery does not light all the lamps long enough, so that if batteries of this size are used there should be two of them, or a larger capacity battery, having at least 80 ampere-hour capacity at a 10-hour rate, can be used.

Any battery made by a reputable maker and having 80 ampere-hour capacity at a 10-hour discharge rate will fulfill all requirements. This latter battery will fulfill all the specifications and has ample plate surface, ample capacity to run all lamps for at least 6 hours and the side and rear lamps for 24 hours.

Method of Wiring System

The use of a bayonet lock socket has now become universal for practically all connection plugs and all lamp plugs, so that there is little need of discussing this. One point, however, that is not entirely cleared up is the type of wire which should be used for motor car work.

The cable to be used for motor cars must stand a test of 12 hours immersion in oil, 12 hours immersion in gasoline and 12 hours immersion in water, and then stand 500 volts applied between the two conductors without breakdown.

Such a wire has ample insulating capacity and will take care of any oil, gasoline or water that it may get in motor car use. Wherever there is any abrasion the cable should be armored either by a light woven metallic armor or by conduit, loom or some similar material. There is no use armoring against heavy abrasion such as might be had by the wire rubbing against the flywheel, as any armor will wear through rapidly in this case, but the armor should take care of the abrasion that occurs on the leads of the lamps as they swing against the frame or some similar part, and almost any of the woven metallic armors will do for this purpose.

Wherever rubber or material that would be dissolved by gasoline or oil is used for insulation it should be protected by another covering impervious to oil or gasoline so as to render it impossible for the insulation to be ruined.

Hardening Difficult With the Facilities of the Small Shop; Vibration Changes Position of Carbureter Stop Screw; American Progress of 10 Years; Peugeot Car Has No Torque Rods; Use of Plastic

Case-Hardening in the Shop

EDITOR THE AUTOMOBILE:—Please tell me how to case-harden with crushed bone, using the tools to do the work that may be found around a machine and blacksmith shop.

Rochester, N. Y. SUBSCRIBER.

—None but very small parts could be treated with the facilities to be found about the ordinary machine or blacksmith shop. The parts to be case-hardened are packed in the bone meal and inclosed in a cast-iron box. The entire box has to be heated.

With iron or soft steel the heating of the box is then carried on until an intense red heat has been reached. This will be close to the melting temperature of the box. The part to be hardened is then chilled in cold water. After carbonizing, as the case-hardening process really is, the metal if it is to be carefully prepared should be annealed at 1,625 degrees Fahrenheit and allowed to cool slowly. It is then reheated to about 1,400 degrees and quenched in water. The temperature to which the box and its contents are raised should be about 1,500 degrees with ordinary steels. Nickel-chrome steels carbonize at 2,000 degrees and tungsten steels at 2,200 degrees. Good work cannot be expected without the facilities of the hardening room.

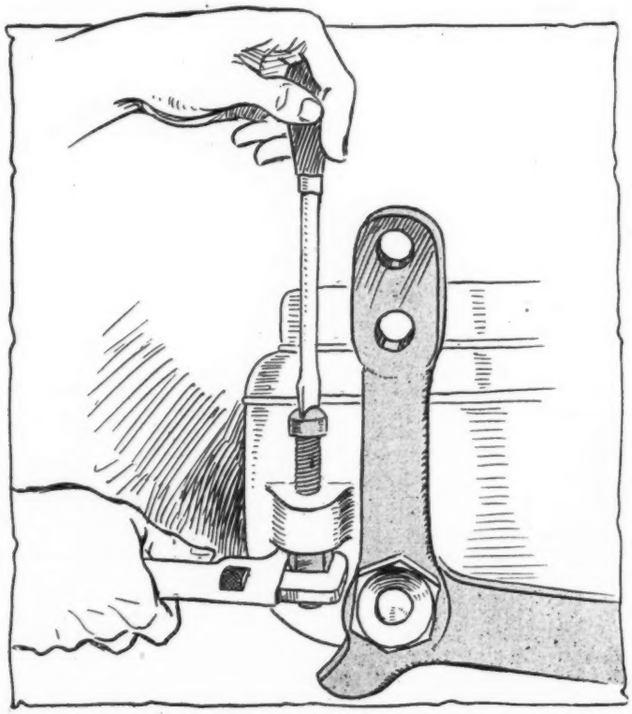


Fig. 1—This screw to be adjusted so motor will run with throttle closed

Motor Won't Throttle Down

Editor THE AUTOMOBILE:—I have just returned from a 400-mile run. During the latter part of the tour, I noticed that I could not get my motor to throttle down in spite of the fact that I had the lever turned as far back as it would go. I thought at the time that the trouble was due to the fact that the motor was somewhat overheated, having run continuously for a great length of time and having passed through some very hilly country. After returning to the car yesterday, however, I found that the motor went so fast when I started it that it could almost be said to be racing. This showed me that it could not be overheated and I am at a loss to account for it. I have not had occasion to run the car since and would like to know what the trouble can be before I start out again.

Worcester, Mass. CHAS. JENKINS.

—The carbureter throttle stop screw has been vibrated out of position. On your carbureter at the point where the control linkage is attached, you will notice a small screw similar to that shown in Fig. 1 which permits the throttle to go back just so far that it will be impossible to stop the motor by means of the throttle alone but which will permit it to run idle at very slow speed without choking up and stopping. This screw should have a lock nut upon it as shown in the illustration which will prevent its working loose and doing the very thing that has happened on your car. On account of the close proximity of the carbureter stop screw to the motor, the vibrations are severer at this point and no doubt you will find that the lock nut has become loosened and permitted the stop screw to turn in so far that the motor cannot be throttled down. In fixing the screw in its proper position its purpose must be kept in sight. Start the motor and slowly turn the stop screw keeping the throttle valve lever close up against it until the motor turns over regularly as slowly as possible. The lock nut is then tightened being sure that the position of the stop screw is not changed when turning the nut.

How We Stood Ten Years Ago

Editor THE AUTOMOBILE:—On page 479-80 of THE AUTOMOBILE for September 5, you have published a selection from a French magazine, which probably represents French conditions of 10 years ago, but it does not do justice to American conditions of that date. I, therefore, wish to call attention to a few things wherein we were much in advance of the French at that time. The writer of that article is wrong about engine speeds, for Duryea three-cylinder engines designed in 1897, 15 years ago, had speeds up to about 2,000 and developed maximum power at about 1,200 r.p.m. This engine was also a monobloc having the three cylinders in a single casting. Prior to this for some 4 years, the two-cylinder casting was used on American vehicles. The throttle control was used in 1895-96, and regularly thereafter; the last governors being applied in the winter of 1895, and although made up and on the engines, were taken off because the throttle control gave such perfect results.

Lubrication by large reservoir cups, which fed by the pressure in the cylinder, was applied about 1889, and was used in conjunction with splash. The automatic air valve was applied to American engines in 1899, and American patents taken out about that time. Low tension dynamos were designed as early as 1893, and made and fitted to vehicles in 1896-97. They not only gave current for ignition, but provided an electric headlight. Tie rods were always behind the axle on Duryea vehicles, even as early as 1892, and one company I was connected with in 1898, owned what seemed to be a basic patent on a worm drive for electric motor vehicles which patent has since expired, and which drive is gaining in popularity. In many other features America was not behind, but instead led foreign inventors; but American capitalists were not willing to take up the new business, and American buyers too busy while at home to see anything but dollars, had to go abroad to be convinced of the merits of the new transportation, in which matter they were greatly assisted by the better qualtiy roads in foreign countries.

In the same issue Mr. Heffly, page 484, hits the nail on the head when he gives as a reason for using the metric system in their American factory, "that our parts could be interchanged with the parts made by European factories." In short, although the American market is almost wholly dominated by supplies made to inch measurements, he would not change, because of the bother of doing so; and this is the meat of the cocoanut. It will never pay American makers to change their sizes simply to conform to a theoretical standard. Foreign buyers have no care whether their goods are measured by inches or some other way, so long as they do the work required of them at the proper price, and American makers must avoid any changes which add to the expense of production, for this would lessen, instead of increase, foreign sales, and do no good at home.

Saginaw, Mich. CHAS. E. DURYEA.

Regarding Peugeot Suspension

Editor THE AUTOMOBILE:—In your interesting description of the Peugeot racer, which THE AUTOMOBILE published recently, it was stated that this remarkable car has neither radius nor torsion rods, all the propulsive effort being transmitted through the rear springs. This being the case, please explain why the above devices are used in practically all pleasure cars, if it is possible to construct a shaft-drive system which will successfully transmit the 175 horsepower of this racer without them.

2—In the same issue mention is made of a governor that will not permit the speed of a vehicle to run above what the owner deems is safe. Has any such governor ever been perfected and if so, where can one be purchased?

East Canaan, Conn. DEWEY C. CANFIELD.

—In the first place, it must be remembered that the suspension of a racing car must be considerably stiffer than of the ordinary touring car. The Peugeot is a pure racer. It has been built for speed, not for comfort. Every bit of extra weight that could be removed without weakening the car has been taken off. With this in view, the attachment of the springs to the frame may be noted Fig. 2. It will be seen that the joint is not a shackle, but merely a rigid connection to the frame by a pivot which permits of motion in but one direction. The torque strains fall entirely on these pivots, which are made heavy enough to stand the stresses imposed. In addition to the rigid support at the frame it will be noticed that two extremely heavy straps are placed one on each side of the differential case, which is also heavily braced by the steel housing not shown in the illustration. The straps are capable of absorbing the entire torque strain if necessary and with the differential housing and heavy spring connection besides, the support is ample. In the case of an ordinary touring car, the springs are made as light as is consistent with strength, to make the riding as easy as possible. The added duties of torque strains would compel the spring designer to make the springs to meet both the strains of suspension and torque and the easy riding qualities would suffer in consequence. The springs in a light touring car are thus made

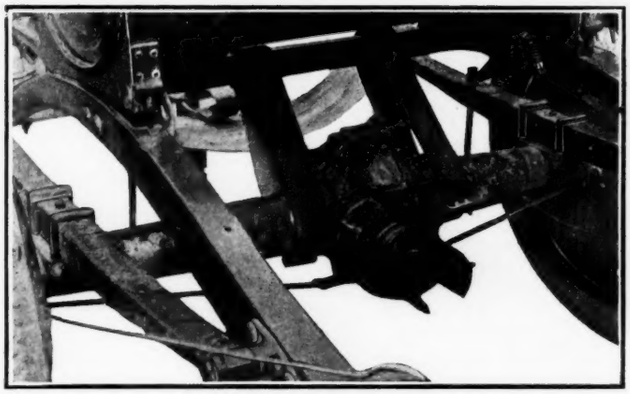


Fig. 2—Rear suspension of the Peugeot. Note heavy straps in place of torque rods

with as flexible a connection as possible and the torque strains are taken up by independent members.

2—A large number of highly satisfactory governors of this type are on the market. Indeed, it is not too much to say that any manufacturer of commercial vehicles in the United States will apply such a governor to his output and will guarantee the correct action of the same within reasonable limits of speed. Any large supply house will carry such a device or will secure one for you at any time.

Using Plastic Tire Mender

Editor THE AUTOMOBILE:—I have purchased a small outfit put up by one of the leading tire concerns, consisting of a can of cement and another can of a stiff plastic preparation which is used to fill cuts in the casing. I would like to know if such a preparation is good to use on tires, if it really does the work and what is the best method of using it. I am sure many others have bought preparations of this kind and then hesitated to use them in the thought that perhaps they were doing the tire more harm than good by their use.

New Rochelle, N. Y. OWNER.

—The preparation you speak of is in common use and it is a very meritorious product. The repairs made with its use are second only to the jobs done by the use of a vulcanizer as far as efficiency goes. If you will carefully go over the tire every little while, seeing that every cut is filled you will get a much greater mileage from a shoe than you would were you to neglect

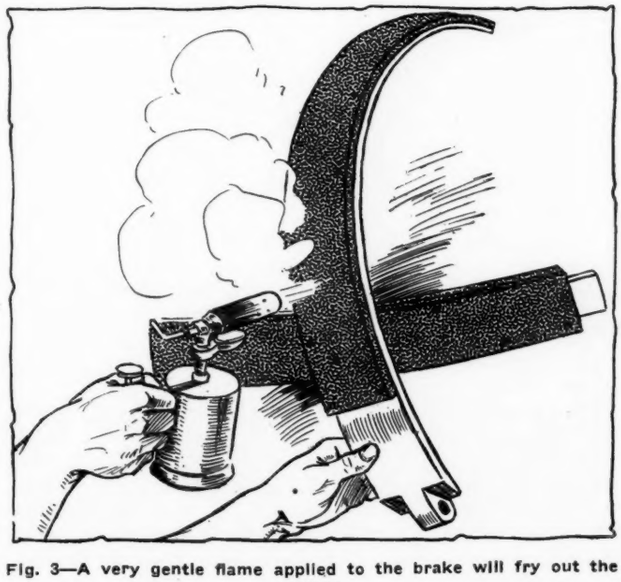


Fig. 3—A very gentle flame applied to the brake will fry out the grease

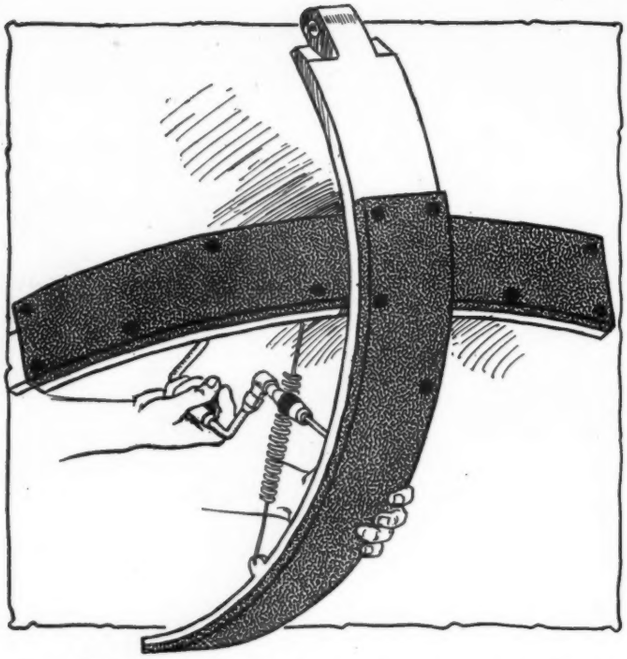


Fig. 4—Holes in the shoe can be used as a guide in drilling the lining

it. The method of using these preparations is practically the same in all of them. The first step is to see that the cut is scrupulously clean. A little gasoline which is applied by soaking a small piece of cloth in the liquid and winding it about a match and then inserting the latter in the cut, rubbing it around the walls, will take out the dirt which will have been forced in by traveling with the tire in that condition. After the cut has been thoroughly cleaned out a coating of the fine cement is applied and allowed to become thoroughly dry. A piece of the plastic, a little larger than the cut, is then taken and kneaded between the fingers. Now apply a second coat of the cemnet to the cut and when this becomes tacky, press in the plastic which has been kneaded until very sticky. Press the plastic firmly into the cut, being sure that it fills it completely. It will attach itself to the tread and will effectually prevent the entrance of water or grit which would end to destroy the fabric and body of the tire. It would be well to make a rule to go over the tire thoroughly every week looking for cuts in the side or face of the tread which would prove a source of weakness and cut down the tire mileage.

Putting Brakes in Condition

Editor THE AUTOMOBILE:—I am about to make a trip through somewhat mountainous country and I wish to put my brakes in the best possible condition; will you kindly tell me through THE AUTOMOBILE exactly what I should do?

Goshen, N. Y. TOURIST.

—There are three things which must be particularly noticed in taking care of the brakes and in putting them in condition for a trip such as you mention. These items are as follows:

1—There must be no grease on the shoes.

2—The fabric must be in the best of condition.

3—The brake linkage must apply the brakes when the pedal is depressed.

These will be taken in order and the method of procedure in fulfilling the three requirements will be shown.

1—The grease which penetrates to the brake shoes works through from the differential. In some cases the grease applied to the bearings in the neighborhood of the brakes will get through to the fabric. Regardless of how the grease has worked its way into the bands, the damage resulting will be the same. The coefficient of friction of the material will be so cut down that the brakes will not hold as they should and for a tour in a mountainous country will be very dangerous. To treat this trouble, the rear wheel should be removed and the brakes taken off. This will be a simple operation regardless of what car you are driving, consisting merely in the removal of the nuts which will be in plain view when the rear wheel is taken off. The next step is to inspect the material with which the brakes are lined and see if the treatment will fall under the head of number 1 or 2, in the list above. Should the trouble be that there is a coating of grease over the surface of the fabric, there will be two methods of procedure. The first is the removal of the grease by the application of gasoline. The gasoline will cut the grease and remove it from the surface very well. The method has one drawback, however, and that is that it does not take the grease from below the surface of the fabric. An inspection of Fig. 3 will show the method employed in some of the large New York repair shops for taking the grease from below the surface of the fabric. The flame of the torch must

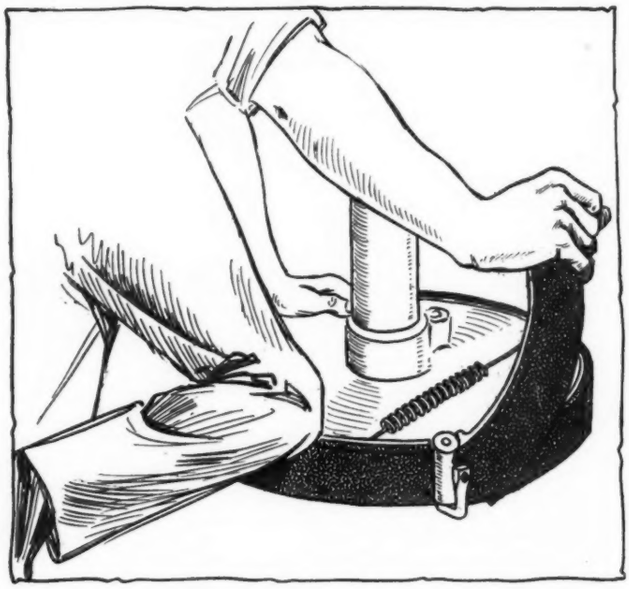


Fig. 5—Step in the assembly of an expanding brake. Spring put on first

be very gently applied so as not to char the fabric itself. After the heat has been directed against the surface of the brake for a short length of time it will be noted that the grease will literally fly out of the fabric leaving it upon the surface in the form of a black carbonaceous deposit. In this state it is readily removed by a cloth steeped in gasoline. The surface of the brake will now be in good condition if the lining has not been worn out. A careful inspection should be made to determine the cause of the leakage of oil or grease to the brakes if it is noted that such leakage is excessive. The differential housing, when the car is in motion is literally filled with flying grease and oil a large part of which works its way along the drive axle. In order to prevent it from working its way out to the end of the axle housing and then into the brakes, a thick wadding of felt is placed around the drive axle and acts in the nature of a stuffing box. In time, the felt will become worn away in some cars where the installation has not been as carefully made as in others. It can readily be replaced and should be, if the driver of the car notices that the brakes exhibit a tendency to slip after a short space of time and examination shows that this is due to the continual passage of grease into the brakes. A slight coating of oil will cause a remarkable falling off in the coefficient of friction and will reduce the efficiency of the brake materially.

2—Assuming that the brake material has been found badly worn. The material may not be torn, but merely worn until it

is flush with the rivet heads. This may be due in a certain number of cases to the fact that the rivet is not sufficiently countersunk and this can be cured by flattening it out further by means of a hammer and riveting iron. In lieu of a regular riveting iron, a nail punch or small chisel will serve excellently. Where the brake lining is torn or worn down so far that it is evidently useless and cannot be restored by cleaning to good condition, it must be replaced. To do this, the fabric is first pried away from the shoe as shown in Fig. 6. The rivet is then cut off by means of a cold chisel and hammer as shown in the same illustration and the rivet then punched out. It will be often very difficult to get the rivet out after the head is cut off, owing to the burr which is placed on the end of the rivet in cutting it. If the brake is placed across the jaws of a vise which is opened just sufficiently to allow the rivet to be punched through, the rivet can be readily removed with a small punch assisted by light blows of a small hammer. Care must be taken in the operation not to spring the shoe out of shape, for to do this would cause the brake to drag later and this would mean an immense loss of power and at the same time the rapid wear of the new fabric. In ordering a new piece of fabric from the factory, it will only be necessary to state the model and year of your car, giving the serial number as additional information. The brake lining will be sent you already punched so that it is only necessary to rivet it in place again and the repair will be made. In some cases, the fabric will be purchased from another dealer and in this instance it is necessary to give the length of the piece of fabric required. This is done by measuring with a tape measure around the periphery of the band to which it is to be applied, or, if the old fabric be carefully removed, this can be measured and will serve admirably as a pattern. When the right length of fabric has been secured, lay it around the drum and, with a drill

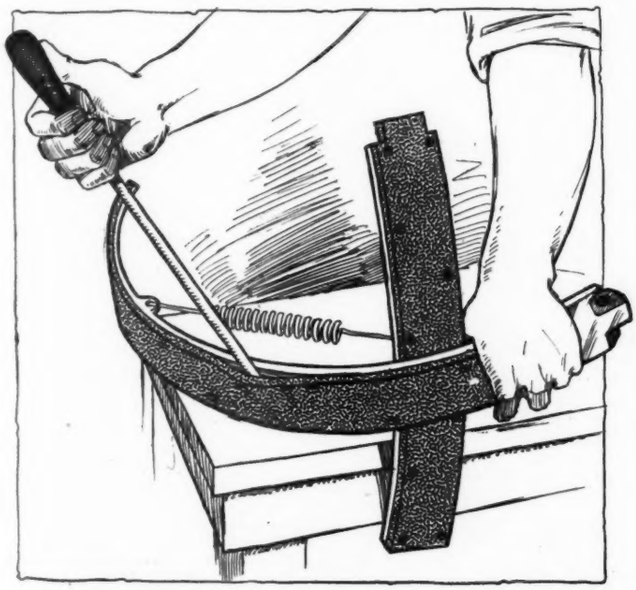


Fig. 6—Before cutting off rivets, pry fabric away from the metal shoe

as in Fig. 4, pierce the holes for the rivets through the new lining. The holes which are already through the metal will serve as a template in marking out the new holes. The holes drilled through the fabric are then countersunk to allow of the head of the rivet being below the surface of the material so there will be no possibility of a metal-to-metal contact between the rivets and the brake drum. The rivets are put through from the fabric side, leaving the head on this side. and riveting them over from the other side. The head of the rivet will be at least 1-16 inch below the surface of the fabric when the work is done.

Replacing the brake upon the drum, if it is of the internal expanding type, will not be an easy matter if the knack is not understood. The drag spring should be first placed on the brake shoe. It can then be sprung over the drum as illustrated in Fig. 5. If the operator tries to place the spring in position after the shoes are in position over the drum, he will have to work entirely against the tension of this spring which amounts to about 20 pounds ordinarily and sometimes more. The best method is to carry the assembly as far as possible without putting the shoes over the drum. One shoe is then placed in position and the other sprung over and immediately fastened. The aid of a second person in slipping the bolt or pin which holds the second drum in place will be a great convenience to one who has not had much experience in the assembling line.

3—The adjustment of the brake links is easily understood and, although the details will vary on every car, any American-made car will use the same method for regulating this part of the brake mechanism so that the brakes will be applied when pressure is placed upon the pedal or pull upon the emergency brake lever. Should the examination of the brakes fail to disclose either wear or grease upon the surface of the shoe, the linkage can be called upon to cure the slip. At each joint in the brake control rods, as they are traced from the pedal or lever to the brake itself, will be found a Y-shaped piece called a clevis. These clevises are capable of being turned to left or right, screwing them off or on the rod which carries them. Screwing the clevis off the rod tends to lengthen the rod whi'e screwing it further on the rod will shorten the total length. When one of the rods is shortened the bell crank lever which applies the brake will be pulled back and the drum pulled closer to the shoe. As a result, when the pedal is all the way down or the lever all the way back the brake is applied with greater force. In some cars a turnbuckle takes the place of the clevis adjustment.

Oakland Uses Northway Motor

Editor THE AUTOMOBILE:—Will you kindly give me the following information: Is the Oakland car an assembled car, and does that company build motors for any other firms?

I have been told that they build the motors for the Cartercar and Cole, and would like to know if they are connected in any way with the Buick Motor Car Company?

Gatesfield, Neb. H. BLANCHARD.

—The Oakland motor car is an assembled car in that it employs the work done by specialists in each line. The motor is a Northway, the rear axle is a Weston-Mott, etc. The Oakland Motor Car Company does not build motors for themselves or for any other concern. The same power plant is used in other cars of which the Cole is an instance. The Northway concern is a constituent company of the General Motors merger which also includes the Buick company and the Oakland, and the two latter companies are thus constituents of the same merger.

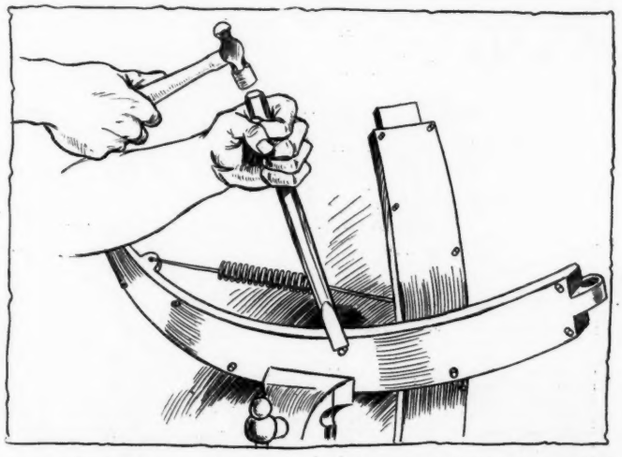


Fig. 7—Be careful in chipping off rivet heads that shoe is not bent

New York, Chicago and Boston Show Space Allotted

Lists Show Big Increases in Representation Over Those of Last Year, Including 405 Exhibitors Comprising All Branches of the Automobile Industry

ALLOTMENTS of space for both weeks of each of the national automobile shows and also for the Boston show have been made by the Motor and Accessory Manufacturers. The lists show a large increase in representation as compared with those of last year and include all told 405 exhibits.

The allotments for each of the shows appear below:

MADISON SQUARE GARDEN, NEW YORK, FIRST AND SECOND WEEKS

Ajax-Grieb Rubber Co.....New York, N. Y.
Automobile Supply Mfg. Co.....Brooklyn, N. Y.
Badger Brass Mfg. Co.....Kenosha, Wis.
Baldwin Chain & Mfg. Co.....Worcester, Mass.
Bijur Motor Lighting Co.....New York, N. Y.
Bosch Magneto Co.....New York, N. Y.
Bower Roller Bearing Co.....Detroit, Mich.
Bowser & Co., S. F.....Fort Wayne, Ind.
Briggs Magneto Co.....Elkhart, Ind.
Brown-Lipe Gear Co.....Syracuse, N. Y.
Buda Co., The.....Harvey, Ill.
Budd Mfg. Co., Edward G.....Philadelphia, Pa.
Byrne, Kingston & Co.....Kokomo, Ind.
Carnegie Steel Co.....Pittsburg, Pa.
Champion Ignition Co.....Flint, Mich.
Chicago Drop Forge & Fdry. Co.....Chicago, Ill.
Coes Wrench Co.....Worcester, Mass.
Columbia Nut & Bolt Co.....Bridgeport, Conn.
Connecticut Telephone & Electric Co..Meriden, Conn.
Consolidated Rubber Tire Co.....New York, N. Y.
Continental Caoutchouc Co.....New York, N. Y.
Cook's Sons, Adam.....New York, N. Y.
Cotta Transmission Co.....Rockford, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Diamond Chain & Mfg. Co.....Indianapolis, Ind.
Diamond Rubber Co.....Akron, O.
Dixon Crucible Co., Jos.....Jersey City, N. J.
Edison Storage Battery Co....West Orange, N. J.
Edmunds & Jones Mfg. Co.....Detroit, Mich.
Eisemann Magneto Co.....New York, N. Y.
Electric Storage Battery Co.....Philadelphia, Pa.
Empire Tire Co.....Trenton, N. J.
Findeisen & Kropf Mfg. Co.....Chicago, Ill.
Firestone Tire & Rubber Co.....Akron, O.
Fisk Rubber Co.....Chicopee Falls, Mass.
G & J Tire Co.....Indianapolis, Ind.
Gabriel Horn Mfg. Co.....Cleveland, O.
Garage Equipment Mfg. Co.....Milwaukee, Wis.
Gemmer Mfg. Co.....Detroit, Mich.
Globe Machine & Stamping Co.....Cleveland, O.
Goodrich Co., B. F.....Akron, O.
Goodyear Tire & Rubber Co.....Akron, O.
Gray & Davis.....Amesbury, Mass.
Harris Oil Co., A. W.....Providence, R. I.
Hartford Rubber Works Co.....Hartford, Conn.
Hartford Suspension Co.....Jersey City, N. J.
Havoline Oil Co.....New York, N. Y.
Heinze Electric Co.....Lowell, Mass.
Hess-Bright Mfg. Co.....Philadelphia, Pa.
Hess Steel Castings Co.....Bridgeton, N. J.
Hyatt Roller Bearing Co.....Newark, N. J.
Janney-Steinmetz & Co.....Philadelphia, Pa.
Johnson & Co., Isaac G.....New York, N. Y.
Jones & Co., Phineas.....Newark, N. J.
Kent Mfg. Works, Atwater.....Philadelphia, Pa.
Kokomo Electric Co.....Kokomo, Ind.
Lefever Arms Co.....Syracuse, N. Y.
Light Mfg. & Fdry. Co.....Pottstown, Pa.
Link-Belt Co.....Philadelphia, Pa.
McCord Mfg. Co.....Detroit, Mich.
Manufacturers Foundry Co.....Waterbury, Conn.
Michelin Tire Co.....Milltown, N. J.
Morgan & Wright.....Detroit, Mich.
Mosler & Co., A. R.....Mt. Vernon, N. Y.
Motsinger Device Mfg. Co.....Pendleton, Ind.
Motz Tire & Rubber Co.....Akron, O.
Muncie Gear Works.....Muncie, Ind.
National Tube Co.....Pittsburg, Pa.
New Departure Mfg. Co.....Bristol, Conn.
New Miller Carburetor Co.....Indianapolis, Ind.
N. Y. & N. J. Lubricant Co.....New York, N. Y.
Oliver Mfg. Co.....Chicago, Ill.
Pennsylvania Rubber Co.....Jeannette, Pa.
Pittsburg Model Engine Co.....Peru, Ind.
Remy Electric Co.....Anderson, Ind.
Republic Rubber Co.....Youngstown, O.
Rose Mfg. Co.....Philadelphia, Pa.
Ross Gear & Tool Co.....Lafayette, Ind.
Royal Equipment Co.....Bridgeport, Conn.
Schrader's Son, Inc., A.....New York, N. Y.
Schwarz Wheel Co.....Philadelphia, Pa.
Sheldon Axle Co.....Wilkes-Barre, Pa.
Smith Co., A. O.....Milwaukee, Wis.
Spicer Mfg. Co.....Plainfield, N. J.
Splitdorf Co., C. F.....Newark, N. J.
Standard Roller Bearing Co.....Philadelphia, Pa.
Standard Welding Co.....Cleveland, O.
Stewart & Clark Mfg. Co.....Chicago, Ill.
Stromberg Motor Devices Co.....Chicago, Ill.
Stutz Auto Parts Co.....Indianapolis, Ind.
Swinehart Tire & Rubber Co.....Akron, O.
Texas Co., The.....New York, N. Y.
Timken-Detroit Axle Co.....Detroit, Mich.
Timken Roller Bearing Co., The.....Canton, O.
Turner Brass Works, The.....Sycamore, Ill.
United Rim Co.....Akron, O.
U. S. Light & Heating Co.....New York, N. Y.
Vacuum Oil Co.....New York, N. Y.
Valentine & Co.....New York, N. Y.
Veeder Mfg. Co., The.....Hartford, Conn.
Vesta Accumulator Co.....Chicago, Ill.
Warner Gear Co.....Muncie, Ind.
Warner Mfg. Co.....Toledo, O.
Weed Chain Tire Grip Co.....New York, N. Y.
Weston-Mott Co.....Flint, Mich.
Wheeler & Schebler.....Indianapolis, Ind.
Whitney Mfg. Co.....Hartford, Conn.
Willard Storage Battery Co.....Cleveland, O.
Williams Co., J. H.....Brooklyn, N. Y.
Wolverine Lubricants Co.....New York, N. Y.
Young, O. W.....Newark, N. J.

MADISON SQUARE GARDEN, FIRST WEEK ONLY

American Ball Bearing Co.....Cleveland, O.
American Bronze Co.....Berwyn, Pa.
American Hardware Corp.....New Britain, Conn.
Auburn Auto Pump Co.....Boston, Mass.
A-Z Co.....New York, N. Y.
Batavia Rubber Co.....Batavia, N. Y.
Borne Scrymser Co.....New York, N. Y.
Chase & Co., L. C.....Boston, Mass.
Columbia Lubricants Co. of N. Y..New York, N. Y.
Cowles & Co.....New Haven, Conn.
Doehler Die Casting Co.....Brooklyn, N. Y.
Double Fabric Tire Co.....Auburn, Ind.
Dover Stamping & Mfg. Co.....Cambridge, Mass.
Dykes Co., John L. G.....Chicago, Ill.
Endurance Tire & Rubber Co.....New York, N. Y.
Esterline Co.....Lafayette, Ind.
Hartford Machine Screw Co.....Hartford, Conn.
Haws, George A.....New York, N. Y.
Hayes Mfg. Co.....Detroit, Mich.
Hess Spring & Axle Co.....Carthage, O.
Hoffecker Co.....Boston, Mass.
Ignition Starter Co.....Detroit, Mich.
International Acheson Graphite Co....Niagara Falls.
Kellogg Mfg. Co.....Rochester, N. Y.
Leather Tire Goods Co.....Ningara Falls, N. Y.
Lee Tire & Rubber Co.....Conshohocken, Pa.
Lovell-McConnell Mfg. Co.....Newark, N. J.
Marathon Tire & Rubber Co.....Cuyahoga Falls, O.
Mezger, C. A.....New York, N. Y.
National Coil Co.....Lansing, Mich.
New Jersey Car Spring & Rubber Co., Jersey City.
Noera Mfg. Co.....Waterbury, Conn.
Pantasote Co.....New York, N. Y.
Piel Co., G.....Long Island City, N. Y.
Randall-Faichney Co.....Boston, Mass.
Sager Co., J. H.....Rochester, N. Y.
Schoen-Jackson Co.....Media, Pa.
Seamless Rubber Co.....New Haven, Conn.
Shaler Co., C. A.....Waupun, Wis.
Simms Magneto Co.....New York, N. Y.
Sparks-Withington Co.....Jackson, Mich.
Springfield Metal Body Co.....Springfield, Mass.
Standard Thermometer Co.....Boston, Mass.
Voorhees Rubber Mfg. Co.....Jersey City, N. J.
Walpole Rubber Co.....Boston, Mass.
Western Tool & Forge Co.....Brackenridge, Pa.
White & Bagley Co.....Worcester, Mass.

GRAND CENTRAL PALACE, FIRST AND SECOND WEEKS

Buda Co.....Harvey, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Gould Storage Battery Co.....New York, N. Y.
Gray & Davis.....Amesbury, Mass.
Hartford Suspension Co.....Jersey City, N. J.
Muncie Gear Works.....Muncie, Ind.
Ross Gear & Tool Co.....Lafayette, Ind.
Schrader's Son, Inc., A.....New York, N. Y.
Simms Magneto Co.....New York, N. Y.
Texas Co.....New York, N. Y.
Timken-Detroit Axle Co.....Detroit, Mich.
Timken Roller Bearing Co.....Canton, O.
Vesta Accumulator Co.....Chicago, Ill.
Warner Gear Co.....Muncie, Ind.
Warner Instrument Co.....Beloit, Wis.
Wheeler & Schebler Co.....Indianapolis, Ind.

GRAND CENTRAL PALACE, FIRST WEEK ONLY

American Hardware Corp.....New Britain, Conn.
Aurora Automatic Machine Co.....Chicago, Ill.
Continental Rubber Works Co.....Erie, Pa.
Esterline Co.....Lafayette, Ind.
Herz & Co.....New York, N. Y.
New Departure Mfg. Co.....Bristol, Conn.
Schoen-Jackson Co.....Media, Pa.
Spacke Machine Co., F. W.....Indianapolis, Ind.
Standard Thermometer Co.....Boston, Mass.
Warner Mfg. Co.....Toledo, O.

CHICAGO, FIRST AND SECOND WEEKS

Ajax-Grieb Rubber Co.....New York, N. Y.
American Bronze Co.....Berwyn, Pa.
Auto Parts Mfg. Co.....Muncie, Ind.
Badger Brass Mfg. Co.....Kenosha, Wis.
Baldwin Chain & Mfg. Co.....Worcester, Mass.
Bosch Magneto Co.....New York, N. Y.
Bower Roller Bearing Co.....Detroit, Mich.
Bowser & Co., S. F.....Fort Wayne, Ind.
Briggs Magneto Co.....Elkhart, Ind.
Brown-Lipe Gear Co.....Syracuse, N. Y.
Buda Co.....Harvey, Ill.
Byrne, Kingston & Co.....Kokomo, Ind.
Champion Ignition Co.....Flint, Mich.
Chicago Drop Forge & Fdry. Co.....Chicago, Ill.
Consolidated Rubber Tire Co.....New York, N. Y.
Continental Caoutchouc Co.....New York, N. Y.
Continental Motor Mfg. Co.....Muskegon, Mich.
Cotta Transmission Co.....Rockford, Ill.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Detroit Lubricator Co.....Detroit, Mich.
Diamond Chain & Mfg. Co.....Indianapolis, Ind.
Diamond Rubber Co.....Akron, O.
Dixon Crucible Co., Jos.....Jersey City, N. J.
Edison Storage Battery Co....West Orange, N. J.
Edmunds & Jones Mfg. Co.....Detroit, Mich.
Eisemann Magneto Co.....New York, N. Y.
Electric Storage Battery Co.....Philadelphia, Pa.
Empire Tire Co.....Trenton, N. J.
Esterline Co.....Lafayette, Ind.
Findeisen & Kropf Mfg. Co.....Chicago, Ill.
Firestone Tire & Rubber Co.....Akron, O.
Fisk Rubber Co.....Chicopee Falls, Mass.
G & J Tire Co.....Indianapolis, Ind.
Gabriel Horn Mfg. Co.....Cleveland, O.
Garage Equipment Co.....Milwaukee, Wis.
Gemmer Mfg. Co.....Detroit, Mich.
Globe Machine & Stamping Co.....Cleveland, O.
Goodrich Co., B. F.....Akron, O.
Goodyear Tire & Rubber Co.....Akron, O.
Gray & Davis.....Amesbury, Mass.
Harris Oil Co., A. W.....Providence, R. I.
Hartford Rubber Works Co.....Hartford, Conn.
Hartford Suspension Co.....Jersey City, N. J.
Havoline Oil Co.....New York, N. Y.
Heinze Electric Co.....Lowell, Mass.
Herz & Co.....New York, N. Y.
Hyatt Roller Bearing Co.....Newark, N. J.
Imperial Brass Mfg. Co.....Chicago, Ill.
Johnson & Co., Isaac G.....New York, N. Y.
Kent Mfg. Works, Atwater.....Philadelphia, Pa.
Kokomo Electric Co.....Kokomo, Ind.
Lefever Arms Co.....Syracuse, N. Y.
Link-Belt Co.....Philadelphia, Pa.
McCord Mfg. Co.....Detroit, Mich.
Morgan & Wright.....Detroit, Mich.
Motsinger Device Mfg. Co.....Pendleton, Ind.
Motz Tire & Rubber Co., The.....Akron, O.
Muncie Gear Works.....Muncie, Ind.
National Coil Co.....Lansing, Mich.
National Tube Co.....Pittsburg, Pa.
New Miller Carburetor Co.....Indianapolis, Ind.
N. Y. & N. J. Lubricant Co.....New York, N. Y.
Oliver Mfg. Co.....Chicago, Ill.
Pennsylvania Rubber Co.....Jeannette, Pa.
Remy Electric Co.....Anderson, Ind.
Republic Rubber Co.....Youngstown, O.
Ross Gear & Tool Co.....Lafayette, Ind.
Royal Equipment Co.....Bridgeport, Conn.
Sheldon Axle Co.....Wilkes-Barre, Pa.
Smith Co., A. O.....Milwaukee, Wis.
Spicer Mfg. Co.....Plainfield, N. J.
Splitdorf Co., C. F.....Newark, N. J.
Standard Roller Bearing Co.....Philadelphia, Pa.
Standard Welding Co.....Cleveland, O.
Stewart & Clark Mfg. Co.....Chicago, Ill.
Stromberg Motor Devices Co.....Chicago, Ill.
Stutz Auto Parts Co.....Indianapolis, Ind.
Swinehart Tire & Rubber Co.....Akron, O.
Texas Co., The.....New York, N. Y.
Timken-Detroit Axle Co.....Detroit, Mich.
Timken Roller Bearing Co.....Canton, O.
Turner Brass Works.....Sycamore, Ill.
United Rim Co.....Akron, O.
U. S. Light & Heating Co.....New York, N. Y.
Vacuum Oil Co.....New York, N. Y.
Veeder Mfg. Co.....Hartford, Conn.
Vesta Accumulator Co.....Chicago, Ill.
Warner Gear Co.....Muncie, Ind.
Warner Instrument Co.....Beloit, Wis.
Warner Mfg. Co.....Toledo, O.
Waukesha Motor Co.....Waukesha, Wis.
Weed Chain Tire Grip Co.....New York, N. Y.
Western Motor Co.....Marion, Ind.
Weston-Mott Co.....Flint, Mich.
Wheeler & Schebler.....Indianapolis, Ind.
Whitney Mfg. Co.....Hartford, Conn.
Willard Storage Battery Co.....Cleveland, O.
Williams Co., J. H.....Brooklyn, N. Y.
Wolverine Lubricants Co.....New York, N. Y.

CHICAGO, FIRST WEEK ONLY

American Ball Bearing Co.....Cleveland, O.
Auburn Auto Pump Co.....Boston, Mass.
Automobile Supply Mfg. Co.....Brooklyn, N. Y.
Batavia Rubber Co., The.....Batavia, N. Y.
Coes Wrench Co.....Worcester, Mass.
Connecticut Telephone & Electric Co..Meriden, Conn.
Cook's Sons, Adam.....New York, N. Y.
Cowles & Co., C.....New Haven, Conn.
Doehler Die Casting Co.....Brooklyn, N. Y.
Double Fabric Tire Co.....Auburn, Ind.
Dykes Co., John L. G.....Chicago, Ill.
Endurance Tire & Rubber Co.....New York, N. Y.
Federal Rubber Mfg. Co.....Cudahy, Wis.
Haws, George A.....New York, N. Y.
Hayes Mfg. Co.....Detroit, Mich.
Hess Spring & Axle Co.....Carthage, O.
Hoffecker Co.....Boston, Mass.
Ignition Starter Co.....Detroit, Mich.
Internat'l Acheson Graphite Co.Niagara Falls, N. Y.
Kellogg Mfg. Co.....Rochester, N. Y.
Leather Tire Goods Co.....Niagara Falls, N. Y.
Lee Tire & Rubber Co.....Conshohocken, Pa.
Michelin Tire Co.....Milltown, N. J.
New Jersey Car Spring & Rubber Co..Jersey City
Pantasote Co.....New York, N. Y.

Piel Co., G.....Long Island City, N. Y.
Racine Rubber Co.....Racine, Wis.
Randall-Faichcny Co.....Boston, Mass.
Sager Co., J. H.....Rochester, N. Y.
Schoen-Jackson Co.....Media, Pa.
Seamless Rubber Co.....New Haven, Conn.
Shaler Co., C. A.....Waupun, Wis.
Simms Magneto Co.....New York, N. Y.
Sparks Withington Co.....Jackson, Mich.
Standard Thermometer Co.....Boston, Mass.
Universal Tire Protector Co.....Angola, Ind.
Valentine & Co.....New York, N. Y.
Voorhees Rubber Mfg. Co.....Jersey City, N. J.
White & Bagley Co.....Worcester, Mass.

BOSTON, FIRST AND SECOND WEEK

Ajax-Grieb Rubber Co.....New York, N. Y.
Automobile Supply Mfg. Co.....Brooklyn, N. Y.
Borne, Scrymser Co.....New York, N. Y.
Bowser & Co., S. F.....Fort Wayne, Ind.
Champion Ignition Co.....Flint, Mich.
Coes Wrench Co.....Worcester, Mass.
Consolidated Rubber Tire Co.....New York, N. Y.
Continental Caoutchouc Co.....New York, N. Y.
Cramp & Sons, Wm., Ship & Engine Bldg. Co., Phila.
Diamond Rubber Co.....Akron, O.
Dixon Crucible Co., Jos.....Jersey City, N. J.
Edison Storage Battery Co....West Orange, N. J.
Electric Storage Battery Co.....Philadelphia, Pa.
Firestone Tire & Rubber Co.....Akron, O.
Fisk Rubber Co.....Chicopee Falls, Mass.
G & J Tire Co.....Indianapolis, Ind.
Goodrich Co., B. F.....Akron, O.
Goodyear Tire & Rubber Co.....Akron, O.
Gray & Davis.....Amesbury, Mass.
Harris Oil Co., A. W.....Providence, R. I.
Hartford Rubber Works Co.....Hartford, Conn.
Hartford Suspension Co.....Jersey City, N. J.
Heinze Electric Co.....Lowell, Mass.
Morgan & Wright.....Detroit, Mich.
Motz Tire & Rubber Co.....Akron, O.
National Tube Co.....Pittsburg, Pa.
Pennsylvania Rubber Co.....Jeannette, Pa.
Remy Electric Co.....Anderson, Ind.
Standard Welding Co.....Cleveland, O.
Stewart & Clarke Mfg. Co.....Chicago, Ill.
Swinehart Tire & Rubber Co.....Akron, O.
Texas Co.....New York, N. Y.
United Rim Co., The.....Akron, O.
U. S. Light & Heating Co.....New York, N. Y.
Vacuum Oil Co.....New York, N. Y.
Veeder Mfg. Co.....Hartford, Conn.
Warner Instrument Co.....Beloit, Wis.
Willard Storage Battery Co.....Cleveland, O.
Wolverine Lubricants Co.....New York, N. Y.
Voorhees Rubber Mfg. Co.....Jersey City, N. J.

BOSTON, FIRST WEEK ONLY

Auburn Auto Pump Co.....Boston, Mass.
Batavia Rubber Co.....Batavia, N. Y.
Columbia Lubricants Co. of N. Y..New York, N. Y.
Connecticut Telephone & Electric Co..Meriden, Conn.
Cook's Sons, Adam.....New York, N. Y.
Double Fabric Tire Co.....Auburn, Ind.
Dover Stamping & Mfg. Co.....Cambridge, Mass.
Endurance Tire & Rubber Co.....New York, N. Y.
Empire Tire Co.....Trenton, N. J.
Federal Rubber Mfg. Co.....Cudahy, Wis.
Havoline Oil Co.....New York, N. Y.
Hawe, George A.....New York, N. Y.
Hoffecker Co., The.....Boston, Mass.
Internat'l Acheson Graphite Co..Niagara Falls, N. Y.
Leather Tire Goods Co.....Niagara Falls, N. Y.
Lee Tire & Rubber Co.....Conshohocken, Pa.
Lovell-McConnell Mfg. Co.....Newark, N. J.
Michelin Tire Co.....Milltown, N. J.
National Coil Co.....Lansing, Mich.
New Departure Mfg. Co.....Bristol, Conn.
N. Y. & N. J. Lubricant Co.....New York, N. Y.
Pantasote Co.....New York, N. Y.
Piel Co., G.....Long Island City, N. Y.
Randall-Faichney Co.....Boston, Mass.
Republic Rubber Co.....Youngstown, O.
Schoen-Jackson Co.....Media, Pa.
Seamless Rubber Co.....New Haven, Conn.
Shaler Co., C. A.....Waupun, Wis.
Splitdorf Co., C. F.....Newark, N. J.
Simms Magneto Co.....New York, N. Y.
Standard Thermometer Co.....Boston, Mass.
Stromberg Motor Devices Co.....Chicago, Ill.
Valentine & Co.....New York, N. Y.
Weed Chain Tire Grip Co.....New York, N. Y.
White & Bagley Co.....Worcester, Mass.

BOSTON, SECOND WEEK ONLY

Baldwin Chain & Mfg. Co.....Worcester, Mass.
Whitney Mfg. Co.....Hartford, Conn.

New York Show Spaces

Car Allotments at Madison Square Garden and Grand Central Palace Made

ALLOTMENTS of space for the automobile show in 1913, which will be held at Madison Square Garden and Grand Central Palace under the auspices of the Automobile Board of Trade during the week commencing January 11, were made Thursday. The members of the Automobile Board of Trade will be housed at the Garden and the other manufacturers will be represented at the Palace.

There will be eighty-seven different makes of automobiles shown, including forty-six at the Garden and forty-one at the Palace. Those who drew space at the Garden are as follows:

Olds, Lozier, Stoddard-Dayton, Oakland, Flanders, Franklin, Stearns, Pope, Stevens-Duryea, Peerless, Locomobile, Mitchell, Winton, Cadillac, Buick, Packard, Hudson, Maxwell, Overland, Pierce-Arrow, Chalmers, Reo, White, Cartercar, Warren, Marmon, Garford, Columbia, Moline, Thomas, Premier, Pullman, Alco, Jackson, Mercer, Auburn, Haynes, S. G. V., Cunningham, Knox, Moon, Matheson, Selden, National, Abbott-Detroit, and Velie.

It will be noted in the list above that the Alco, Auburn and Abbott are listed as members of the Automobile Board of Trade as they were elected to membership recently and have qualified. A number of additional applications for membership have been made and acted upon, but no announcement has yet been made as to who are included in the new list.

The companies that will show at the Palace are as follows: Imperial, Cole, Inter-State, Case, Herreshoff, Krit, Cutting, Kissel, Paige-Detroit, Speedwell, Pathfinder, Austin, Regal, Buffalo Electric, Flanders Electric, Columbus, Metz, Studebaker, Fiat, Hupmobile, Kline, Henderson, Michigan, Benz, R. C. H., Bergdoll, Stutz, American, Rambler, Ohio, Crow, Edwards, Atlas, Lenox, Davis, Paterson, Marathon, Havers, Westcott, Only Car and Marion.

Salon Dates January 2-11

As has been the case for several years past the 1913 automobile show season in this country will be inaugurated by the Annual Salon of Imported Cars, held in New York. The dates for the coming salon are January 2-11 and it will again be staged in the grand ball room of the Hotel Astor. Among those who have already arranged to have Paris exhibits shipped to this country are, De Dion Bouton, Isotta, Fraschini, Lancia, Mercedes, Metallurgique, Minerva, Panhard and Renault. This list represents five nations, France, Germany, England, Italy and Belgium.

Motor Trucks Cause Strike

Chicago Company's Teamsters Quit When Motor Trucks Are Used With Them

FOR the first time since the introduction of the motor truck in the Chicago commercial field teamsters struck during the day because the trucks had been used in part to replace team service by the Consolidated Bottling Company. The company installed six motor trucks, each of which will do the work of two teams. Thirty regular teamsters walked out. The teamsters wanted each motor truck restricted to do the work of only one team.

"The company called for the police to guard its property and threatened to shut the teamsters out for good unless they return to work. George Lomax, president of the concern, said the men violated their agreement."

The above, from the Chicago *Tribune*, October 4, shows something of the attitude assumed by certain branches of the teamsters' unions toward motor transportation, and shows also how, through ignorance, a man or bunch of men may stand in their own way.

The trouble arose over the fact that a motor driver made a delivery and collection at a point on another man's route. Since drivers are paid for the amount they sell off the wagon, the man whose territory was invaded made objection and was upheld by his mates.

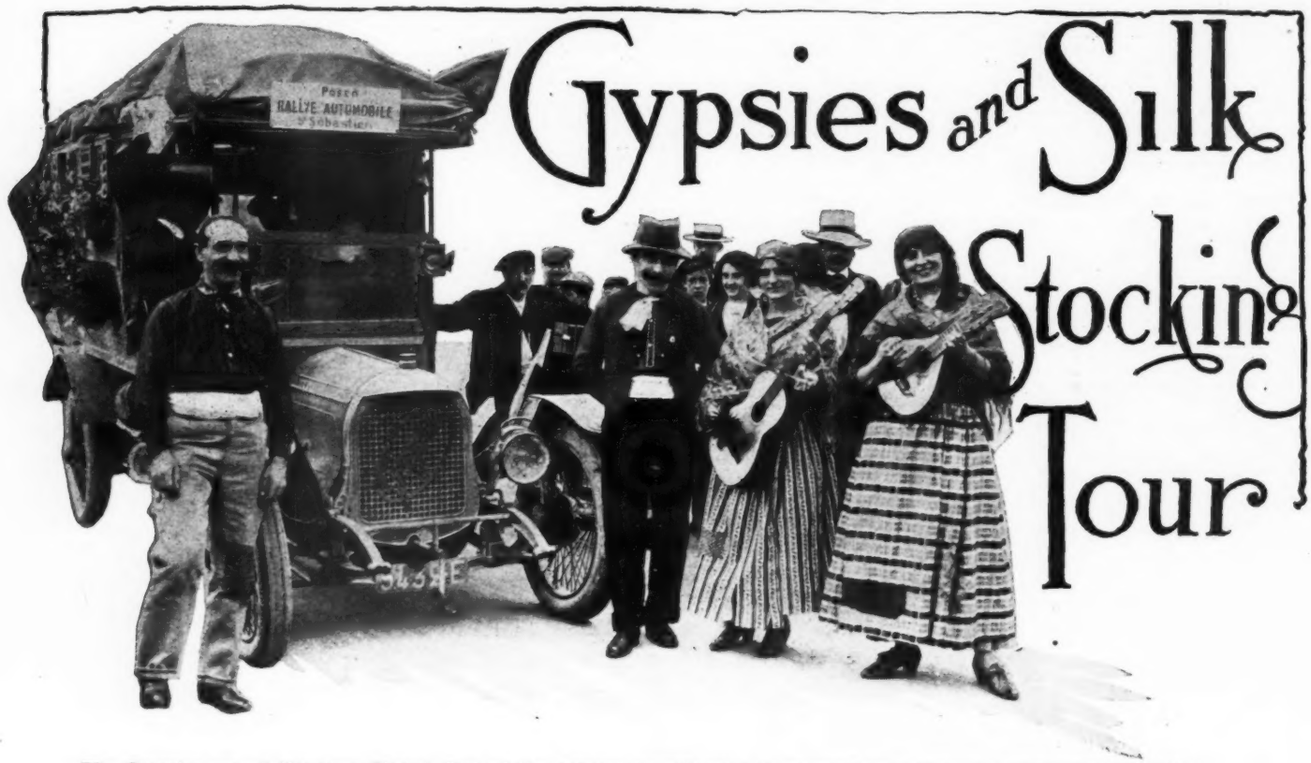
Their general attitude toward their work in this district is shown by an incident on visiting the bottling works in question. To reach the works one must pass under a railway bridge about a block long, dark and damp. Under this bridge, on the trip in, a team and wagon was noticed standing on the far side of the wide roadway, the horses with heads drooped and the driver sound asleep on the seat.

On account of the teamsters' attitude, according to Mr. George Lomax, president of the bottling works, it has been necessary to have three men on some of the trucks. In hiring a driver the teamster refuses to give up his wagon and, upheld by the union, must ride on the motor truck, make the sales and receipt, while a boy is taken along to help in the unloading. This is only on heavy routes.

The motor trucks make as high as 80 miles a day, the longest run made daily being 38 miles out and back to Joliet, Ill. Several of the machines make two runs a day of 40 miles each. Thirty-five stops are made per trip of 10 to 15 minutes each. Drivers take back empty cases.

One hundred cases are carried to a load, weighing 40 pounds each. The trucks are of 2-ton capacity and are built by the Consolidated Company for their own use. Trucks run full both ways.

Gypsies and Silk Stocking Tour



The Gregoire car of Monsieur Picard, first of the general classification A, showing the passengers costumed as Gypsies

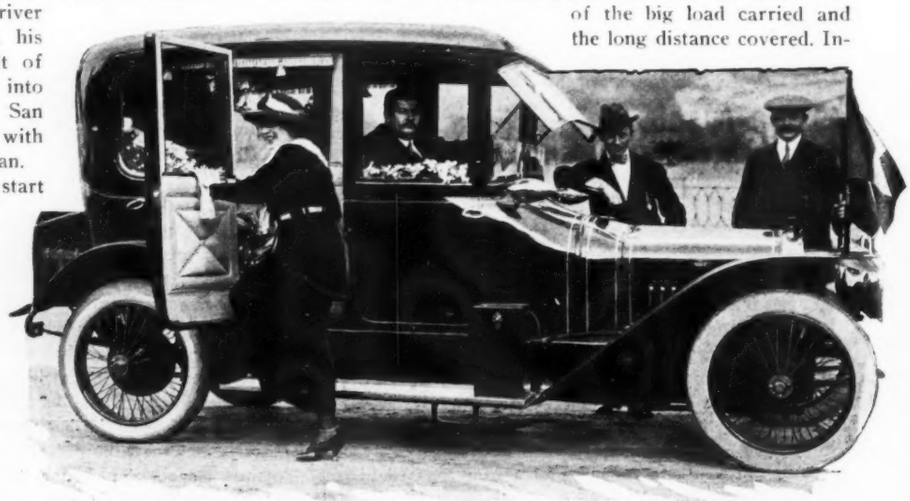
SAN SEBASTIAN, Sept. 27—Out of about 100 competitors a Gregoire caravan won first place in the European rally ending at San Sebastian. The Gregoire people were wise enough to see that in order to win this competition they must carry the greatest possible number of passengers, travel the greatest distance and have the smallest possible motor. They therefore selected one of their semi-racing types of chassis, having a high-efficiency grand prix type of motor and sent it to Posen, in Poland, to make a run of 1,470 miles ending at the Spanish holiday resort. The chassis was specially trussed with a view to carrying eleven persons, representing with their baggage, accessories and bodywork a load of about 3 tons.

With a keen eye to business the Gregoire company equipped this chassis with a caravan body bought for a few dollars from a band of wandering gypsies. With all the accessories, such as chimney, flower pots, bird cages, sweeping brushes, bundles of rags, etc., the combination was so strange that the police were required to keep the spectators back in nearly every town passed through. The crew, consisting of race driver Porporato, the Gregoire agent in Berlin, his wife and relatives, entered into the spirit of the movement, transforming themselves into wandering gypsies, and on arrival at San Sebastian driving through the town with banjoists seated on the roof of their caravan.

The rally regulations provided that a start should be made from various European cities on given dates, the competitors uniting at Bordeaux, then proceeding in a group to San Sebastian. They had to maintain a commercial average of 19 miles an hour and about 240 miles a day. For every 100 kilometers (62.5 miles) they received 4 points; for every passenger, 5 points; for every 100 kilograms (220 pounds) in weight, 1 point; for a closed body, 8 points, and for an open body, 3 points. To equalize chances deductions were made as follows: for every liter cylinder area, 10 points; for every kilometer less than the average imposed, 2 points.

To get advantage of the mileage points nearly all the competitors sought to start as far away from San Sebastian as possible. Results showed that the rules were such that the short-distance tourists had little chance of being well placed. The necessity of running out to a distant starting point necessarily increased the mileage, many of the cars covering 1,000 miles before officially beginning the run. There were exceptionally few failures to meet the minimum requirements, for over sixty cars made the trip from such points as St. Petersburg, Warsaw, Berlin, Amsterdam, Vienna, Milan, Brussels, etc., without a loss of points, and their final position could only be determined after careful weighing and calculation. The Gregoire, heading the list with 144.9 points, was followed by a Hispano-Suiza with 116.6 points, a Berliet with 108.7, a Laurent-Klement with 104.5, an Apollo with 101.1 and sixty others in decreasing value.

The feature of the tour was the small size of the motors in view of the big load carried and the long distance covered. In-



The Delage car which won first prize for elegance in closed cars

A closed car with inside drive ascending one of the mountain traversed

tended primarily as an advertising scheme for the town of San Sebastian, the rally had the valuable quality of showing up the regularity of cars under long-distance touring conditions and of revealing what can be done with motors of really very small dimensions. The accompanying table, giving the particulars of the first ten cars only, shows the distance covered.

In addition to these, fifty-two others were classed, among them being a Ford car, the only American competitor in the rally. A few days before the start of the event some changes were made in the rules; as notification of these could not reach Russia before the departure of the competitors from St. Petersburg a separate list of awards was made for all those having started the run from Russian territory. Under this heading the winner was a Metallurgique car of 3.5 by 5.5 inches bore and stroke, covering a distance of 2,225 miles in its run from St. Petersburg, and securing 163 points, the highest number given to any competitor. The car had a torpedo touring body with five persons aboard. The second under the heading was a Russo-Baltique, of 4 by 5.1 inches bore and stroke, with seven persons aboard, also coming from St. Petersburg, and winning 152 points. The third was a similar car with only two passengers, also from St. Petersburg, and winning 96 points.

On arrival at San Sebastian an elegance competition was held, when the inside steering Delage, having won eighth place on the general list, was awarded the first prize for elegant appearance being followed by the Metallurgique coupé hailing from Brussels, a similar car from Berlin, a Scap, a Gregoire inside steering, and a Scar. In the open-car section the first prize winner was M. Aschoff's Metallurgique torpedo, followed by two other Metallurgique torpedoes, Paul Garnier's La Buire torpedo, a Mercedes torpedo, a La Buire, a Berliet, and an Anasagasti.

A hill-climbing competition was also open to all the rally competitors divided into three classes, two of them being for open cars, two for closed cars and one for cars without any limitation. In the small section of the open cars the fastest was Porporato's Gregoire, which with its caravan body had carried eleven persons across Europe. It covered the 3 kilometers of winding gradient averaging 10 per cent., and having a number of difficult turns, in 4 minutes 31 1-5 seconds. Second was a Scar in 4 minutes 47 seconds; third, a Gobron in 5 minutes 17 seconds; fourth, a Rolland-Pilain in 5 minutes 17 2-5 seconds; fifth, a Gobron in 5 minutes 20 3-5 seconds, and, sixth, inside steering Delage in 5 minutes 33 3-5 seconds.

In the big touring car class the first prize winner was a Rolls-Royce in 4 minutes 33 4-5 seconds, second being a Delaunay-Belleville, followed by a Turcat-Mery, a Scap and a Renault.

In the touring car section the first four were Mathis, 4:24 2-5; Ford, 4:32; Crespelle, 4:32 3-5; Sava, 4:47. The fastest big touring car was a Benz in 4:06 1-5, followed by Rolls-Royce, 4:07; Graft & Stift, 4:17 2-5; Metallurgique, 4:47 1-5; Lorrain-Dietrich, 4:53 3-5.

Gaillon Climb

PARIS, FRANCE, Oct. 6—Cable—This year's Gaillon hill-climb was won by Fritz Erle's Benz in 22 seconds, 1 second less than last year. His performance means a speed of 101.5 miles per hour up the 1 kilometer with 9 per cent. gradient. The other times were:

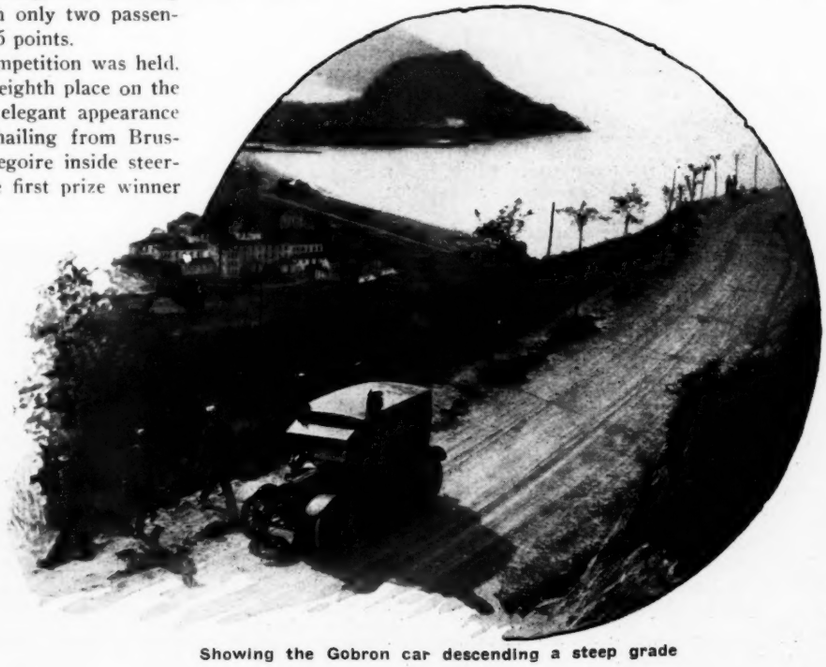
Car	Driver	Time	Car	Driver	Time
	Crespelle	:36	Alcyon	Barriaux	:41
Anasatti	Guyot	:37	Bugatti	Pouget	:45.3
Hispano-Suiza	Bara	:37.3	Buzatti		:53.2
Bedelia*	Bonville	:39.3			

*Renault aviation motor.

Touring cars which climbed the hill and their drivers were:

Car	Driver	Time	Car	Driver	Time
Hispano-Suiza	Derny	:80	Motobloc	Delpierre	:50.4
Benz	Erle	::43.3	Barre	Ravaud	:52
Scap	Mollet	:47	Scap	Launais	:55.1
Sunbeam	Rigal	:47.4	Bugatti	Tonello	:58
Scap	Charles	:48	Panhard-Knight	Artault	:58

Car	Bore & Stroke	Start. point	Miles	Body	Passengers	Points
Gregoire	3.1 by 5.9 ins.	Posen, Poland	1470	caravan	11	144.9
Hispano-Suiza	3.1 " 7 ins.	Warsaw	1640	torpedo	4	116.6
Berliet	2.7 " 3.9 ins.	Berlin	1304	berlin	4	108.7
Laurin-Klement	2.7 " 4.3 ins.	Vienna	1320	torpedo	4	104.5
Appolo	3 " 4.6 ins.	Koenigsberg	1660	touring	6	101.1
Berliet	3.9 " 5.5 ins.	Vienna	1320	limousine	4	98.1
Simplicia	2.7 " 3.9 ins.	Berlin	1304	touring	4	97.1
Delage	2.9 " 4.7 ins.	Amsterdam	1052	berlin	4	88.5
Sava	3.1 " 5.5 ins.	Brussels	907	torpedo	6	77.58
Metallurgique	4 " 5.9 ins.	Brussels	907	coupe	5	77.55



Showing the Gobron car descending a steep grade

Harking Back a Decade

Alexander Winton Set New Track Marks at Providence—73 Entered in New York-Boston Run

FROM *The Automobile and Motor Review*, October 4, 1902: The Right Honorable Arthur J. Balfour, M.P., is considered one of the most enthusiastic users of the automobile in England. The British premier uses his cars for business and relaxation.

The rules for the hill trials and tire tests recently held under the auspices of the Automobile Club of Great Britain and Ireland were entirely different from those in effect during the New York-Buffalo run of last year. As far as the entered cars were concerned they were classified according to their listed prices and their manufacturers guaranteed to supply duplicates of the entered cars to customers who place orders before a specific date.

The Detroit Automobile Club, which was organized last June, now has a membership of sixty. F. H. Newberry is president.

Alexander Winton, in his Bullet, set new gasoline automobile marks from 2 to 5 miles at the race meeting held in Providence, September 24. The turns were not banked and the rear wheels of the car slewed around with such abandon that after Mr. Winton had made 5 miles of the scheduled assault on the 10-mile record held by Fournier, he slowed down and abandoned the attempt. Up to 5 miles his time was faster than ever before made on a circular dirt track. The 2 miles were covered in 2:12 1-4; 3 miles, 3:18 3-4; 4 miles, 4:25, and 5 miles, 5:30 3-5. This ranges from 1 to 2 seconds faster for each of the distances. The Cannon steam racer established a new mark for steamers when it covered the mile in 1:05 1-4.

The German Emperor used his automobile frequently during the field maneuvers of the army, just concluded. The Crown Prince acted as driver on more than one occasion.

Exports of automobiles and parts for the week ending September 27 were valued at $13,435.

The New York aldermen are considering the enactment of an ordinance to tax hacks and public conveyances from $2 to $5 for license to operate, including automobiles in its terms. Private conveyances are to be taxed $10 a year. The automobile fraternity is solidly arrayed against the proposed measure.

Entries have closed for the New York to Boston and return reliability run and seventy-three contestants are indicated. The original rules drafted called for an average speed of 15 miles an hour, but the Automobile Club of America has amended them so that the average speed limit must be 14 miles an hour. First-class certificates will be issued to those contestants who maintain an average of from 12 to 14 miles an hour. The entries consist of fifty-five gasoline automobiles, seventeen steam vehicles and one electric. The cars range in rated horsepower from 4 to 24, the latter being an Ohio and a Pope.

Court Enjoins Devious Route

ALBANY, N. Y., Oct. 7—Supreme Court Justice Rudd on Saturday issued an injunction restraining C. Gordon Reel, state highway superintendent, and the highway commissioners from letting a contract for a proposed state road between Trenton and Remsen, Oneida County. The restraining order was obtained at instance of Lester G. Wauful, a taxpayer of Oneida County, who declared that under the original highway scheme, a straight road between the two towns was provided for, but this was changed by the Highway Commission last March by deviating so that the village of Prospect, N. Y., would be included. His lawyer argued that Prospect is being taken care of by a county road and that if the Highway's Commissioner's order were observed, residents of the direct route would be the sufferers.

MILWAUKEE, WIS.—To reduce the number of accidents due to collisions between street cars and automobiles in Milwaukee, the Milwaukee Electric Railway & Light Company is using large display space in the daily newspapers, warning drivers as well as passengers to use more caution. The campaign was carried on heaviest during the period of the Vanderbilt cup races, when thousands of outside motorists brought their cars to Milwaukee.

Accelerometer—Its Use and Value

(*Continued from page 729.*)

the bench test from which the torque curves in Fig. 1 are derived. In short, the carbureter is likely to choke and so cause loss of torque. This explanation is borne out by the fact that when grade climbing on bottom gear the carbureter has time to act, and it was found that the car in question was capable of climbing a grade steeper than 1 in 5, equivalent to an acceleration reading exceeding 6 1-2 feet per second per second. Some carbureters have better starting qualities than others and curves such as these bring out the differences. As regards *d*, an initial starting acceleration of about 7 would, with, say, two-thirds of the car weight on the rear axle, correspond to a ratio of tractive effort to axle load of about one-third; this should not cause slipping if the clutch is let in gently, but with suddent starting the momentary acceleration may rise enough to cause slipping to begin, and once begun it is liable to continue.

Ideal acceleration would require to conform to the following conditions: It should at any moment absorb the full output of which the engine is capable, that is, the horsepower exerted should be constant, and it should be graduated so that the acceleration does not increase or decrease faster than a certain rate.

It may be said at once that neither of these conditions can be fulfilled by the motor car as at present made. Material alterations would be necessary. To yield a constant horsepower throughout the starting period—and when hill-climbing—it would require to be fitted with an infinitely variable gearbox; instead of there being three torque curves, as in Fig. 1, there would be only one, viz., the rectangular hyperbola, which would be the envelope of an infinite number of such curves. The limit to the vertical height to which such a hyperbolic torque curve could usefully be taken would be the limiting torque at which the rear road wheels would slip. The curve corresponding to these conditions is that shown at A B C in Fig. 7. Modification is needed even in this curve, however, if the acceleration is to be graduated with time. To provide for the acceleration not growing faster than a certain number of feet per second per second in a second it is necessary to replace the vertical line O A with the parabolic arc shown dotted.

To conform to these ideals the car would probably need either electric or hydraulic transmission. Both of these have been shown to be capable of giving a hyperbolic torque curve, and the former has been found able to give a graduated acceleration. Any successful application of them should therefore find a wide use both on road and rail.

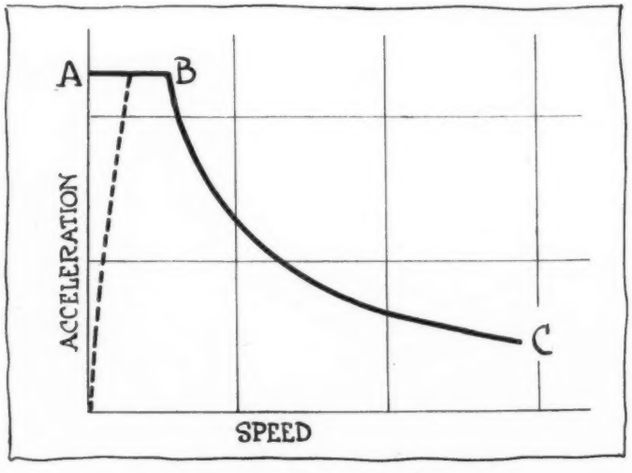


Fig. 7—Curve showing ideal acceleration

Nagent Wins Ardennes

Makes High Score in 269-Mile Race of Much-Mixed Elements, Including Speed, Reliability and Hills

SPA, BELGIUM, Sept. 27—Speed, regularity, and endurance were the determining factors in the 269-mile race held in the Belgian Ardennes. Unable to obtain the exclusive use of the set of roads, the route was divided into twelve sections, of which eight had to be covered on a regularity basis according to cylinder area, and four at speed; of these four there were three straight sections and one rather difficult hill-climb. Some very high speeds were maintained by the small racing and touring cars, and under the formula the small motors had an advantage over the big ones, for although these latter were the fastest they did not succeed in winning high places on the list of awards.

In the racing section highest points were won by a Nagent, a four-cylinder of 2.7 by 4.8 inches bore and stroke, whose time for the four-speed sections of respectively 7, 9, 4, and 8-mile stretches were 63.1, 64.1, 63.3 and 52.1 miles an hour. This last time represents the hill-climb. Second place went to a Mathis of 2.7 by 4.7 inches bore and stroke, third to an Alfa-Legia of 2.5 by 3.9, and fourth to Christiaens six-cylinder grand prix Excelsior. This car was the fastest in the meeting, its highest average being 93 miles an hour, but it was at a disadvantage on the regularity sections, where an unusually high average speed had to be maintained on roads open to all kinds of traffic.

In the touring classes Germany had all the glory, an Opel winning first place, followed by a Benz. French cars were not very well represented, and two Flanders were classed respectively twenty-first and twenty-sixth.

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LOS ANGELES, CAL., Oct. 4—With the annual Los Angeles to Phoenix road race less than 1 month away the indications point to ten entries. Entry fees have been received for only six cars but others are certain to come in.

The changing of the route will make the course even sportier than before as the cars will again have the heavy sand of the California desert with which to battle.

The distance is 450 miles and is over part of the old route, used prior to last year, and part of that of last year. Out of Los Angeles the cars will follow the boulevard to Pomona and, from a spectacular standpoint, the race will prove as attractive as ever.

For the first 100 miles the cars will have good roads. Then will come the first taste of desert and for the next 50 miles there will be many dangerous places. Beyond Mecca more sand will be encountered and from there on to Clamys and Brawley the race becomes a true desert battle. The Mammoth Wash will prove the undoing of more than one contestant and the cars will be put to their best before reaching Yuma where the machines will be placed in a control for the night.

Unless the time of starting is changed the cars will have a long wait over in Yuma as the first machine is due to reach there well before noon. The first cars will leave Los Angeles about 10 o'clock and the last at midnight.

The prize money will amount to about $3,500 and for the track races in Phoenix $4,000 has been offered.

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Crowd of 4,000 at Asheville Climb

ASHEVILLE, N. C., Oct. 3—Under ideal weather conditions, the first sanctioned A. A. A. hill-climb in Asheville was held today, 4,000 people witnessing the cars climb the steep French broad avenue hill, a grade of 12 per cent. for nearly 5 miles, the distance of the climb. The summaries are: Cars under 161 cubic inches: First prize, cup—won by Studebaker 20; time 55 3-5 seconds. Second prize, $5—won by Studebaker 20; time 1 minute 10 2-5 seconds.

Second event, for cars with piston displacement of 161 to 230 cubic inches: First prize, cup—won by Ford; time 52 2-5 seconds. Second prize, $10—won by Studebaker 30; time, 56 1-5 seconds.

Fourth event, for cars with piston displacement of 301 to 450 cubic inches: First prize, cup—won by Buick; time, 49 4-5 seconds. Second prize, $5—won by Nyberg; time, 56 2-5 seconds.

Sixth event, free-for-all: First prize, cup—won by Nyberg; time, 53 1-5 seconds. Second prize, $10—won by Ford; time, 54 1-5 seconds.

Seventh event, cars with bodies valued at $1,600 and under: First prize, cup—won by Studebaker 20; time, 56 1-5 seconds. Second prize, $5—won by Chalmers; time, 64 3-5 seconds.

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Sunbeam Breaks World's Record

LONDON, ENG., Sept. 30—New marks were made at Brooklands, when a 15.9-horsepower Sunbeam lowered the world's records for 900 miles, 12 and 13 hours, and the 1,000 miles. A 30-horsepower, six-cylinder Sunbeam put up new figures for the world's record of 50 miles in 32 minutes 16.4 seconds from a standing start, thereby reducing the record by almost 35 seconds. The Sunbeam company attempted to lower the figures recently put up by the 12-horsepower Star car for 12 hours. The engine dimensions for the two cars were identical, namely 80 millimeters by 150 millimeters. The speeds of the Star car ranged from 66 3-4 miles per hour, to 67 3-4 miles per hour. The average speed for the 12 hours, was 66.82 miles per hour. The first few miles ranged from 76 to 85 miles per hour.

Again on September 21, this same firm put up new figures for the distances mentioned at the beginning of these notes. The 15.9 horsepower, four-cylinder Sunbeam added 3 miles, 203 yards to the 12-hour record, which is now 910 miles, 1,738 yards, and by covering the 1,000 miles in 13 hours, 8 minutes and 25.1 seconds, reduced the old time by 1 hour, 45 minutes, 50 3-5 seconds. When the final burst was made, the official time was returned for the 1,000 miles as 13 hours, 8 minutes and 25.1 seconds, thus creating a world's record.

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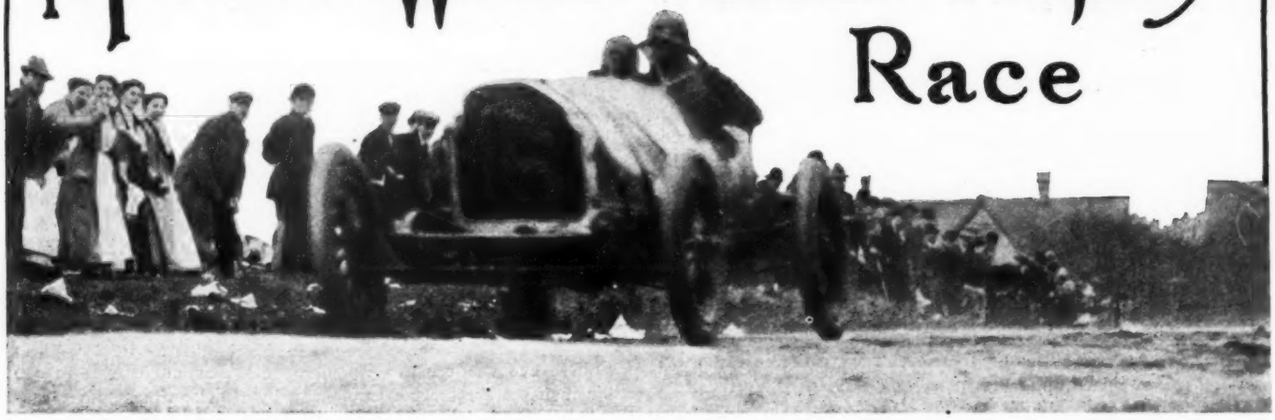
DES MOINES, IA., Oct. 7—The annual reliability run of the Iowa Automobile Association which was to have started from Des Moines Monday, October 7, for a circuit of the state has been postponed until October 14.

Digest of the Leading Foreign Technical Journals

(*Continued from page 721*)

and 2.5, taken from Fig. 3, do not result from a range of useful motor speeds running from 1,200 to 1,800, but from one running from 1,120 to 1,800. It is rather an advantage that now the range of the high speed, extending from 37.5 to 60 kilometers per hour, has been somewhat enlarged, because with the direct drive the friction losses of the gearbox are switched out and it therefore becomes possible to drop the motor speed a little lower without feeling the effect in the running of the vehicle. By checking the results it is thus confirmed that with a four-speed gear ranging over the ratio of 1 to 4 [and, it should have been added, with a motor whose best working range lies between 1,120 and 1,800 revolutions per minute.—ED.] the intermediate gears should be proportioned as 1.6 to 2.5, and rather a little lower than higher. And at the same time the applicability of the easy graphic method to other gear combinations has been demonstrated—From article by Von Löw in *Zeitschrift des Mitteleuropäischen Motorwagen Vereins,* end of August.

Mason Wins Pabst Trophy Race



Bill Endicott skimming the high spots during one of his bursts of speed in the race for the Wisconsin Challenge Trophy

MILWAUKEE, WIS., Oct. 5—The small car races which were run off on Thursday, Oct. 3 were a sort of anti-climax to the big Vanderbilt Cup classic of Wednesday. These races were the Pabst Blue Ribbon Trophy race for 28 laps, or 220 miles 3,704 feet, and the Wisconsin Motor Challenge Trophy event, which is for 22 laps, or 173 miles 2,156 feet. Mortimer Roberts, driving a Mason Special, romped away with the longer run, while the Wisconsin Challenge went to Harry Endicott, also driving a Mason car. Only two cars finished the Pabst race, these being Roberts' Mason and Hastings' F. A. L. Special, the latter having averaged 52 miles an hour for the entire distance, while Roberts averaged 58.8 miles an hour.

Although there were four prizes offered for the Pabst race, only three awards were made, the third place being given to Chandler, also driving a F. A. L. Special, after he had completed twenty-three of the twenty-eight laps. There was no other car running to which the fourth award could have been accorded. It was nearly dusk when Hastings' F. A. L. crossed the tape for the twenty-eighth time, and it would have been impossible for Chandler, still 50 miles behind, to have driven the remaining five laps owing to the growing darkness. Consequently, Starter Wagner gave him the checkered flag at about the same time that he signaled the other F. A. L. on its final lap.

The Wisconsin Motor Challenge Trophy race had five entries, but at the appointed time only the three Mason cars lined up for the twenty-two-lap run. Two of them finished the race, Endicott's No. 5, which came in first in the time of 186 minutes 44.79 seconds, and Mason's No. 3, which required 222 minutes 40.35 seconds to cover the distance of nearly 174 miles. After going for three laps, Snyder's Mason developed clutch trouble, which put it out of the race. In this race, too, an award went begging.

Eight cars lined up for the start of the Pabst Blue Ribbon Trophy event, which was run simultaneously with the Wisconsin Trophy race. Nikrent, driving a Case, was the first to be sent off, following him Rooney in a Bergdoll. Then came Spencer Wishart driving the first of the three Mercers entered in the event. After him Hastings in a F. A. L. Special, while Roberts in Mason No. 16 was the fifth. Pullen, piloting the second Mercer, was next away, then Chandler in F. A. L. No 18 got the word. Hughes was the last to get away in the third Mercer.

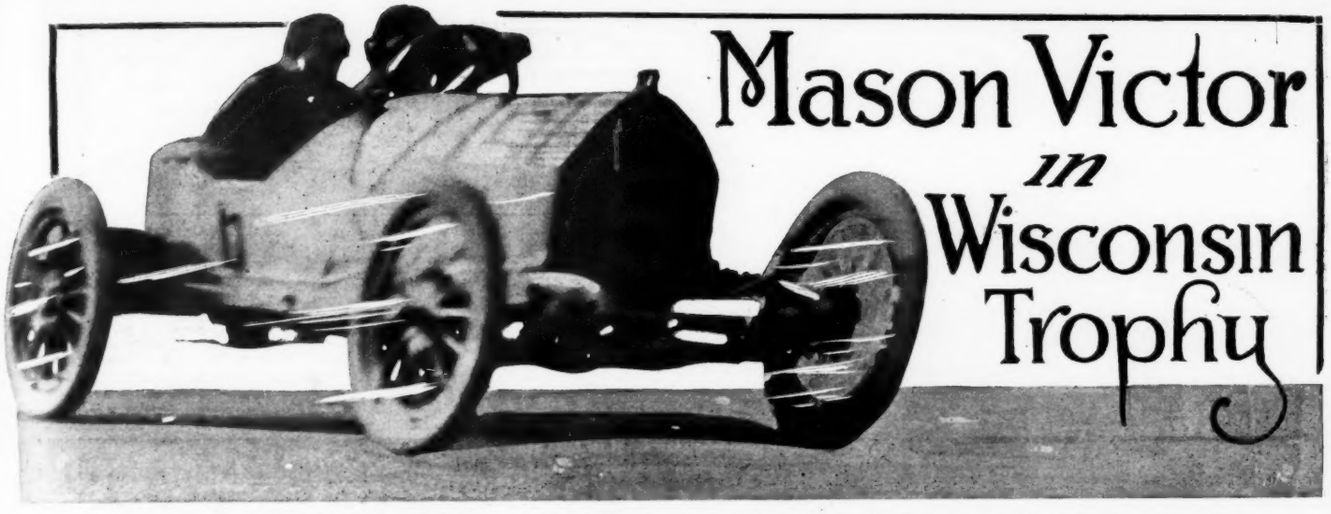
Hughes drove the same car which he used on Wednesday in

RACE OF 220.64 MILES FOR THE PABST BLUE RIBBON

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04	9 70.92	10 78.80	11 86.68	12 94.56
16	MASON-Special	Roberts	Elapsed Time	7:35	14:49	22:12	29:28	36:48	44:05	51:21	58:34	65:43	77:48	93:05	100:20
			Lap Time		7:14	7:23	7:16	7:20	7:17	7:16	7:13	7:09	12:05	15:17	7:15
15	FAL-Special	Hastings	Elapsed Time	10:06	19:49	32:45	42:26	51:29	60:16	69:12	77:50	86:34	95:06	103:39	112:13
			Lap Time		9:43	12:56	9:41	9:03	8:47	8:56	8:38	8:44	8:32	8:33	8:34
18	FAL-Special	Chandler	Elapsed Time	9:32	18:25	27:13	35:58	44:16	53:32	62:20	71:07	79:52	88:31	97:11	105:49
			Lap Time		8:53	8:48	8:45	8:18	9:16	8:48	8:47	8:45	8:39	8:40	8:38
17	MERCER	Pullen	Elapsed Time	7:59	15:32	23:02	30:34	38:06	45:29	52:58	60:21	67:55	75:23	82:52	90:22
			Lap Time		7:33	7:30	7:32	7:32	7:23	7:29	7:23	7:34	7:28	7:29	7:30
19	MERCER	Hughes	Elapsed Time	7:45	15:08	22:29	33:03	40:37	47:50	54:59	62:09	69:11	76:15	83:16	90:18
			Lap Time		7:23	7:21	10:34	7:34	7:13	7:09	7:10	7:02	7:04	7:01	7:02
14	MERCER	Wishart	Elapsed Time	11:50	19:47	27:39	35:24	43:07	50:45	58:22	66:00	73:41	81:30	89:15	96:57
			Lap Time		7:57	7:52	7:45	7:43	7:38	7:37	7:38	7:41	7:49	7:45	7:42
12	BERGDOLL	Rooney	Elapsed Time	8:16	16:17	25:26	34:57	43:06							
			Lap Time		8:01	9:09	9:31	8:09	Out with broken connecting rod						
11	CASE	Nikrent	Elapsed Time	8:09	15:43	23:09	30:53	44:43							
			Lap Time		7:34	7:26	7:44	13:50	Out with broken crankcase						

RACE OF 173 MILES AND 2156 FEET (TWENTY-TWO LAPS) FOR WISCONSIN

No.	CAR	DRIVER	Lap Miles	1 7.88	2 15.76	3 23.64	4 31.52	5 39.40	6 47.28	7 55.16	8 63.04
5	MASON-Special	Endicott	Elapsed Time	12:15	20:11	27:59	35:38	43:07	50:51	59:04	67:40
			Lap Time		7:56	7:48	7:39	7:29	7:44	8:13	8:36
3	MASON-Special	Mason	Elapsed Time	13:04	26:35	36:11	46:17	55:48	65:13	74:32	84:05
			Lap Time		13:31	9:36	10:06	9:31	9:25	9:19	9:33
2	MASON-Special	Snyder	Elapsed Time	10:57	21:10	29:11					
			Lap Time		10:13	8:01	Out with clutch trouble				



Mason Victor in Wisconsin Trophy

Roberts driving his Mason Special to victory in the last lap of the 220-mile race for the Pabst Blue Ribbon Trophy

the Vanderbilt, but in order to do this he was obliged to change motors. The Vanderbilt Cup race is limited to cars having piston displacements between 301 and 600 cubic inches, while the Pabst Trophy race required that the piston displacement should not be over 300 cubic inches. The motor which Hughes used in the Vanderbilt race had a bore only .017 inch greater than that of the engine used for the Pabst race.

On the first lap Roberts took the lead, making the distance of nearly 8 miles in 7 minutes and 35 seconds.

In the following circuit the leader retained his position, and the only change in the eight cars was Wishart's nosing of Hastings out of the seventh position.

In the fourth lap Hughes slipped from second place to fourth, owing to his being forced to stop at the pit for water. One of the water connections of his Mercer had been jarred loose, heating up his motor considerably in the run from the point on the course where the break occurred to the pit. Pullen, who had made the lap in 7:32, now assumed second place, while Nikrent was a close third, being only 19 seconds behind. Wishart, in this lap, nosed Chandler out of sixth position.

After filling his radiator Hughes was off again at a lively clip, cutting down his rivals' lead at every turn. In the fifth lap he snatched third place from Nikrent, who was having trouble, while Chandler came into fourth place. The fifth lap was the undoing of both Nikrent and Rooney, both of whom were forced to give up the struggle after completing about 40 miles. Nikrent's car was disabled by a cracked crankcase, while Rooney's Bergdoll snapped a connecting-rod.

By this change of fortune Wishart came into fourth standing, while Hastings became sixth, Chandler fifth, Hughes remained third, Pullen stayed second and Roberts was first.

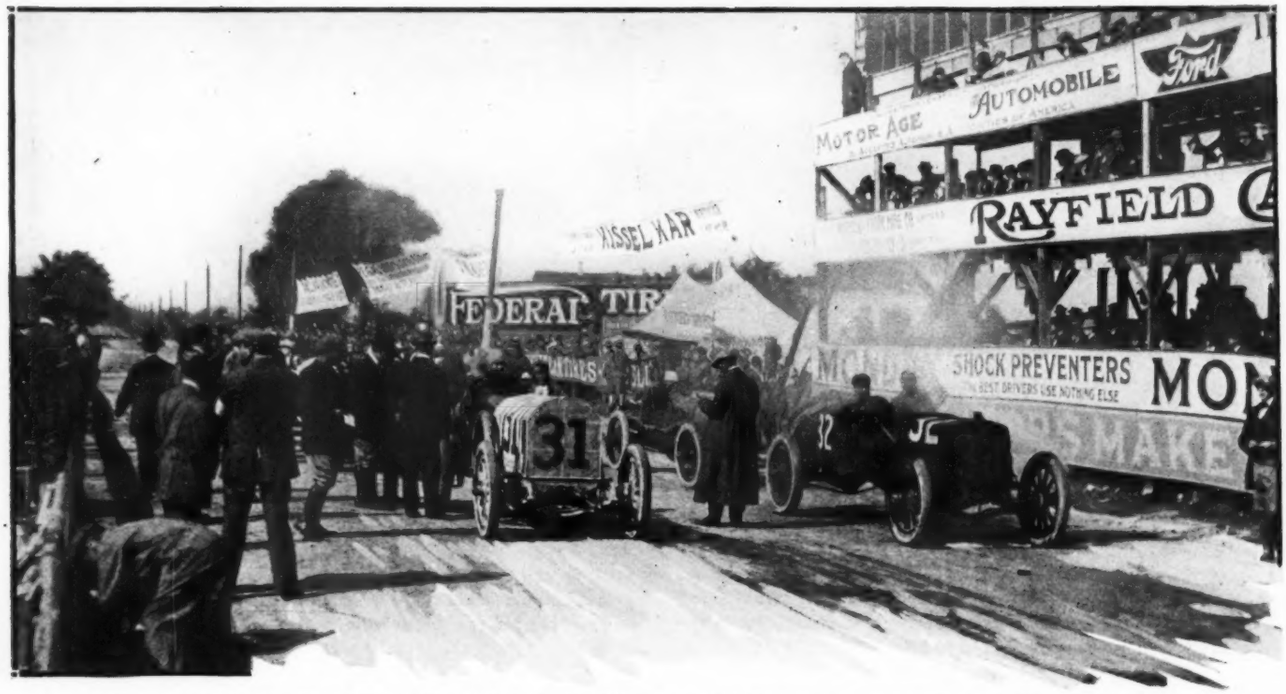
For the sixth, seventh, eighth and ninth laps there was no change in the places of the contestants. Roberts was still leading, Pullen second, Hughes third, Wishart fourth, Chandler fifth and Hastings sixth. Hughes made the ninth in 7:02, which helped to put him in second place when Roberts was forced to stop on the backstretch to repair a break in the gasoline supply pipe of his Mason. Pullen then succeeded to the premier position and for the next ten laps the race was a duel between Hughes and Pullen. At the end of the tenth lap the order was Pullen, Hughes, Roberts, Wishart, Chandler and Hastings. For four laps, often repairing the gasoline line, the eleventh, twelfth, thirteenth and fourteenth, Roberts remained in fourth position, but was gaining on the leaders every mile.

TROPHY RUN AT MILWAUKEE, WIS., ON OCTOBER 3, 1912

13 102.44	14 110.32	15 118.20	16 126.08	17 139.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	23 181.24	24 189.12	25 197.00	26 204.88	27 212.76	28 220.64	Position	Miles per Hr.
110:16	117:27	124:34	131:44	138:50	145:58	153:05	160:10	167:10	174:18	181:29	189:08	197:38	207:08	216:32	225:08.71	1	58.8
9:56	7:11	7:07	7:10	7:06	7:08	7:07	7:05	7:00	7:18	7:11	7:39	8:30	9:30	9:24	8:36.71		
120:36	128:59	137:25	145:44	154:10	162:29	170:48	179:09	187:23	195:47	204:16	212:57	223:27	233:25	245:07	255:05.1	2	51.9
8:23	8:23	8:26	8:19	8:26	8:19	8:19	8:21	8:16	8:24	8:19	8:41	10:30	9:58	11:42	9:58.1		
114:26	123:11	131:54	140:42	150:27	173:45	199:10	211:41	223:12	235:25	248:08							
8:37	8:45	8:43	8:48	9:45	23:18	25:25	12:31	11:31	12:13	12:43	Stopped and given third place owing to darkness						
97:53	105:18	112:42	120:08	127:53	135:31	144:07	151:43	159:09	166:42								
7:31	7:25	7:24	7:26	7:45	7:38	8:36	7:36	7:26	7:33	Out with broken transmission							
98:27	105:38	112:36	119:29	128:08	135:05	142:00	149:02	156:24									
8:09	7:11	6:58	6:53	8:39	6:57	6:55	7:02	7:22	Out with broken universal joint								
104:43	112:32																
7:46	7:49	Out with broken crankshaft															

MOTOR CHALLENGE TROPHY RUN AT MILWAUKEE, WIS., ON OCTOBER 3

9 70.92	10 78.80	11 86.68	12 94.56	13 102.44	14 110.32	15 118.20	16 126.08	17 133.96	18 141.84	19 149.72	20 157.60	21 165.48	22 173.36	Miles per Hour
77:01	85:17	93:30	101:58	110:12	118:38	127:03	135:30	145:06	154:21	162:29	170:39	178:52	186:44.79	55.6
9:21	8:16	8:13	8:28	8:14	8:26	8:25	8:27	9:36	9:15	8:08	8:10	8:13	7:52.79	
93:29	102:55	112:18	121:38	133:35	142:48	152:19	162:29	172:16	181:54	193:03	202:28	213:11	222:40.35	46.7
9:24	9:26	9:23	9:20	11:57	9:13	9:31	10:10	9:47	9:38	11:09	9:25	10:43	9:29.35	



Getting ready for the Grand Prix—The technical committee inspected the cars very carefully up to the start of the race

Meanwhile, Hughes and Pullen were fighting it out to a finish, although the former was gaining rapidly on his team mate. At the end of the tenth lap Pullen was in the lead by 52 seconds. On the next round Hughes cut this down to 24 seconds, and on the twelfth circuit he had passed his rival and was 4 seconds ahead. Hughes' average speed for eleven laps, or nearly 87 miles, was 62.12 miles an hour, while Pullen covered the same distance slightly faster—62.6 miles an hour.

It was in the fifteenth lap that Spencer Wishart's Mercer gave out. From the eleventh lap up through the fourteenth he had been in third place about 6 minutes behind Pullen and Hughes, and was making these rounds in good time, well over a mile a minute. But on the fifteenth round he was obliged to give up the struggle, for the crankshaft of his motor broke on the backstretch.

At the end of the sixteenth Pullen was less than a minute behind Hughes and was pushing the leader to the limit. But in the next round Hughes blew a tire, which put Pullen in the lead again by 15 seconds.

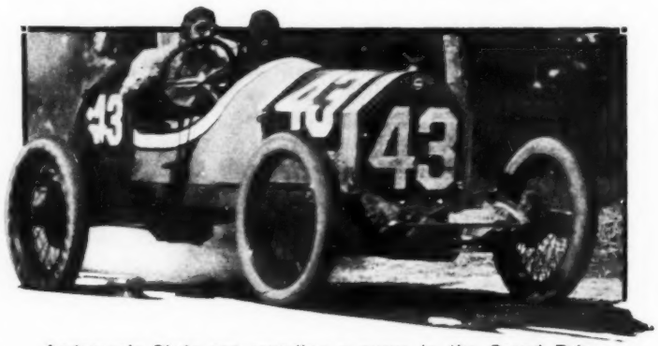
Hughes lasted for three more laps, which he made in fast time. The nineteenth was made in 6:55, and it put him a little over 2 minutes ahead of Pullen. Barring accident, it looked as though Hughes would repeat his Eigin victory. But in the twenty-second lap he had to give way to the other Mercer driver, as his No. 19 Mercer had broken a universal joint, a damage which prohibited immediate repair.

Pullen was now an easy leader, being 8 minutes ahead of Roberts, who did not fare much better than did Hughes, for after going only one more lap, something went wrong with his transmission and the trouble was of large enough proportions to prevent his finishing the race.

After Pullen and Hughes went out, Mortimer Roberts, who had previously been running third, came into the limelight.

In the twenty-third lap the three cars running were the two F. A. L.'s and the Mason, Hastings' F. A. L. running a poor second to Roberts. Chandler was far in the rear.

Roberts finished the race in 225 minutes 8:71 seconds, averaging 58.8 miles an hour for the 220 miles, while Hastings finished in 255 minutes 5:1 seconds, averaging 52 miles an hour. When Hastings finished it was getting dark and the judges decided to flag Chandler and to give him third place without waiting for him to finish.



Anderson's Stutz car rounding a curve in the Grand Prix

Race for the Wisconsin Trophy

LITTLE interest centered in the Wisconsin Motor Challenge Trophy race, which was all Harry Endicott. At the same time he drove a heady race and made good time with his little Mason. Mason, also driving a Mason car, ws the only other car to finish the race, coming in far behind Endicott. Although there were five entries for the event, Kulick, who was to have driven a Ford Special, withdrew, as did Heber, whose entry was an E-M-F.

At the start only the three Mason Specials were in evidence, Snyder in Mason No. 2 being the first to be sent off. Then Mason was started, while Endicott, in entry No. 5, was off last. Snyder's running was better than that of his two teammates for the first lap, but Endicott did not take long to head him off, and at the end of the second lap he was way ahead of the other two. Mason was third, and the second place would undoubtedly have gone to Snyder, whose car is much faster than Mason's, which is a remodeled touring car, had the former not developed clutch trouble in the fourth lap, which trouble proved to be so serious that Snyder had to withdraw in favor of the other two Masons.

Endicott's fastest lap was his fifth, which was run in 7:29, and which is good going for a small machine. He made only two stops during the entire run of 173 miles, the first being on his first lap, when a spark-plug was replaced.

The Falcar was the only one to finish without trouble of any kind. Not a stop was made at the pits by Hastings, even to fill his tanks. Wishart in the Mercer ran 100 miles without a stop till he went out for good. Robert's Mason special, the winner of the larger class, made one stop on account of a broken gas lead. This was repaired by putting in a piece of hose. When he started out again the car stopped after a few yards because he had forgotten to turn on the gasoline again at the tank.

Endicott, the winner of the small-car race, made two stops, the first after one circuit when a spark plug was changed. The other was in the seventeenth lap for gasoline. Mason, driving the Mason No. 3, an old stripped touring car, held the record of the day for stops, making five during the 173 miles of the Wisconsin Motor Challenge Trophy contest.

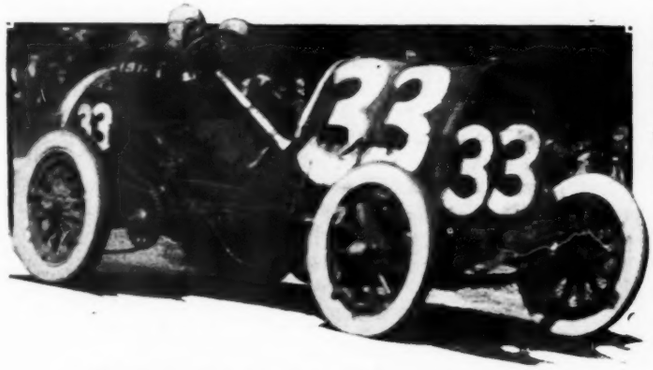
There were eight stops at the pits in the Pabst Trophy race, two for tire troubles. There were two cases of mechanical trouble. The other stops were for fuel, water and oil.

Fiat Wins Grand Prix at Milwaukee

(Continued from page 711)

changes were on the right rear wheel which has the hardest service. Refilling fuel, oil and water tanks were responsible for more stops than any other cause, and mechanical difficulties were comparatively few, necessitating only ten stops altogether, three of which put the cars out permanently.

Anderson with his Stutz holds the palm for the longest non-stop run of the day. He made only two stops during the entire 410 miles of the race and ran the first 215 miles without a halt.



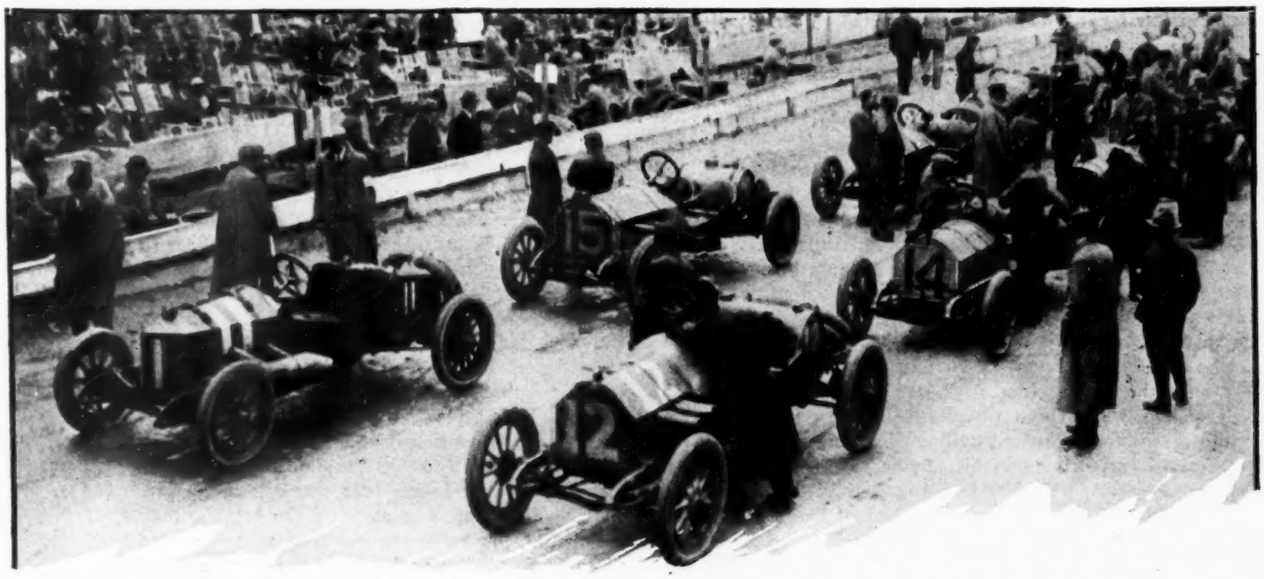
Tetzlaff speeding his Fiat on the Town Line straightaway

He had no mechanical trouble, and he changed but one tire throughout the race, replacing the demountable wheel on the left rear in the twenty-seventh lap. At the same time he took on gasoline and oil. His only other stop was on the next to the last lap, when he refilled his gasoline tank and was away again in 40 seconds.

Like Anderson, Bragg made only two stops, the first being after he had run 166 miles, when he changed both rear tires and took on gasoline and oil. His other stop was at the end of the thirty-seventh lap when he refilled his supply tanks and changed the left rear tire. Bergdoll made but four stops, the first to take on gasoline and replace a spare tire which had been changed on the back stretch, getting away in 46 seconds. When the race was half over he lost 3 minutes and 40 seconds at the pits in changing tires, renewing his supplies and tightening up shock absorbers. After running 30 miles more he stopped 45 seconds to put a strap around the fuel tank which was beginning to work loose. He stopped again for gasoline and a spare tire in the thirty-eighth lap and in the forty-third to put on two rear tires.

Barney Oldfield started the ball rolling at the pits, when after his first circuit of the track he replaced a rear tire. He had not gotten away when Burman pulled up after completing 15 miles and adjusted the valves of his engine. He had not had time to properly tune up the engine before the race; in fact, the start had been delayed 10 minutes to give him a chance to get it in order. Hughes stopped in his third lap to change spark plugs and again in the fourth for the same purpose. Then there was a lull at the pits till Oldfield drew up for another tire change. Tetzlaff stopped twice for tires and fuel after running 80 miles. Before he got away Horan pulled up to replace a spare and take on gasoline, but waited to change a right rear tire. He had started out when the shouts from his pit told him that the jack had been left in the track in the excitement, and the mechanic did a record-breaking sprint back to pick it up. Even at that, Horan was away in less than 2 minutes. When the race was two-thirds over Horan lost 6 valuable minutes for Burman, who relieved him, by running in on the rim from the back stretch where he had blown a tire. This damaged the wheel so that it had to be replaced by one from Burman's Benz before a tire could be put on.

De Palma holds the record for rapid tire change, when at his first stop in the twenty-fifth lap he replaced a tire in 37 seconds. At the end of his next circuit of the course the Italian stopped again, this time to put oil on the rocker arms. After another 15 miles he halted again and worked at his motor for nearly 4 minutes adjusting the valves. His last stop was made in the



Lineup of the contesting cars for the Pabst Blue Ribbon Trophy race, showing a typical morning scene of road race preparation

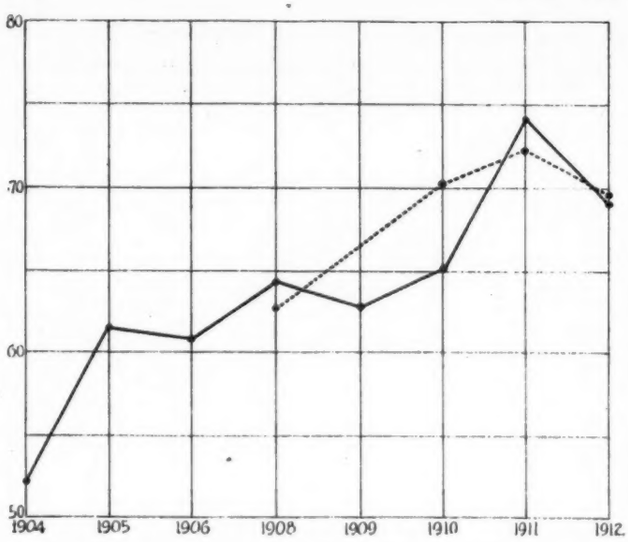


Diagram showing average speed in each year. Heavy line—Vanderbilt cup race. Dotted line—Grand Prix

thirty-seventh lap when he changed a tire and took on water.

The record of Clark's Mercedes is nearly as good as that of the Stutz. Clark made but two stops, the first one being after running 190 miles, when he took on gasoline and oil. His second and last stop occurred in the thirty-fifth circuit of the course, when he lost over 10 minutes in repairing a leak in the water cooling system. Clark was the most fortunate so far as tire troubles were concerned, as he did not change a tire throughout the race.

Bob Burman, in Benz 31, was the first to get away, followed by Fountain in a Lozier. Fountain is a Milwaukee pilot, and he drove the same car which Nelson, its owner and entrant, drove in the Vanderbilt Cup race of Wednesday. Next came Teddy Tetzlaff, demon driver of them all, at the wheel of Fiat 33. He was trailed by Hughie Hughes in the sturdy Mercer. The ill-fated De Palma was off 30 seconds later in his Mercedes 35. Spencer Wishart, who drove a Mercer in the Pabst race of Friday, was in command of another Mercedes, entry number 36. Clark was next off in Mercedes 39. Bergdoll, at the wheel of the immense Benz 40, followed. After him was Bragg, Fiat 41, who had withdrawn from the race following Bruce-Brown's death, but who was persuaded at the last minute to compete. Benz 42, which was scheduled to be driven by Joe Dawson, winner at Indianapolis in June, was sent away by Horan instead. Gil Anderson in the Stutz, which looked small beside the immense foreign machines, got the word next, and finally came Oldfield in Fiat 44. Although a favorite with the crowd, no one expected Barney to go the distance. He has never finished a road race before. More than that, he finished in the money.

Tetzlaff took the lead in the first lap, with Bragg second and Bergdoll third. Wishart and De Palma were in fourth and fifth places, respectively, while the others came around in the following order: Burman, Hughes, Horan, Anderson, Fountain, Clark and Oldfield. The latter would no doubt have shown up better on this first circuit had he not been delayed by tire trouble. This was the first stop at the pits, but the crowd spurred the veteran driver on.

The second lap saw only two shiftings of positions among the cars in the rear position. Wishart took Bergdoll's place in third position, while Hughes overtook Burman, forcing the latter into seventh position, and putting Hughes in sixth. All this time Tetzlaff was driving in his terrific slam-bang style, much the same as he did in the Vanderbilt race of Wednesday. After completing his second lap, Burman stopped at the pit with engine trouble, the same trouble, by the way, which delayed the start of the race for 10 minutes. In his third lap Burman was permanently out of the race, his big Benz having succumbed to a broken piston.

Burman out, Anderson came from ninth into seventh place. Hughes, who had to stop at his pit on his third lap to change a spark plug, went back to last place at the end of the third. The shift brought Clark up to tenth, Oldfield having passed him. Fountain was running now in eighth place, while Horan became sixth. The leaders retained the same position which they had held during the second lap.

The third was Wishart's last lap; in the fourth his motor was disabled by a broken crankshaft, a break which prohibits quick repair. Bergdoll now became third, while De Palma moved up to fourth place. Horan succeeded to fifth place, Anderson to sixth, Fountain to seventh, Oldfield to eighth, Clark to ninth and Hughes to tenth. Tetzlaff, way in the lead, was reeling off the miles at a lively clip. Bragg was a good second.

The fifth saw no changes in the positions of the leaders, the only difference in the ten contenders being that both Anderson and Fountain passed Horan. Hughes, running last, came to the pit again in the fifth lap with more spark plug trouble.

In the sixth lap Clark passed Oldfield, who was obliged to stop to replace a right rear tire. The veteran driver made quick work of the change, but he did not regain his lost ground until the ninth lap. There was no other change in the line-up in the sixth lap, Tetzlaff still leading by a good margin and hotly pursued by Bragg, Bergdoll and De Palma.

It was in the seventh lap that De Palma snatched third place from Bergdoll, who stopped for fuel and an extra supply of tires to replace those used on the backstretch. This wait put Bergdoll into sixth place, Fountain and Anderson passing him as well as De Palma. Tetzlaff and Bragg were still running first and second, respectively.

The eighth lap brought out no differences in the line-up, while in the ninth the only position change was in Oldfield's taking eighth place from Clark. In this lap Fountain went through the straw bales on the Fond Du Lac road turn, but he was soon on the road again, no one having been hurt, and the car apparently none the worse for the mishap.

In the eleventh Tetzlaff made his first stop at the pit, thus giving his lead to Bragg, who was running nicely, and whose car had performed so far without a hitch. Tetzlaff changed a right rear tire and was soon away again in pursuit of Bragg. In this lap Horan, who had been running seventh, passed Anderson, Bergdoll and Fountain and took fourth position momentarily, only to drop back on the following round. The Stutz car then took fifth place, Bergdoll sixth and Fountain seventh. Bragg retained the lead over Tetzlaff from the eleventh through the fourteenth lap, closely pursued by the former. All this time De Palma was running third, and Anderson, except for the thirteenth lap, when he was momentarily nosed out by Bergdoll, was in fourth position. In the fourteenth lap Bergdoll blew a tire on the backstretch at station 4 and the delay put the Benz entry into seventh position, both Oldfield and Fountain passing it. Hughes was still worrying along in last place.

The fourteenth lap was Tetzlaff's fastest and also the fastest lap ever covered over the Wauwatosa course, he making the circuit in 6 minutes 7 seconds, at the average speed of 77.2 miles an hour. This hitting it up gave Teddy the lead again, which he held through the next lap, Bragg running consistently and but a few seconds behind. On lap seventeen Tetzlaff made a pit stop which cost him 2 minutes and 22 seconds, and put Bragg in the lead.

At the end of the seventeenth lap the cars stood Bragg, Tetzlaff, De Palma, Anderson, Bergdoll, Fountain, Oldfield, Clark, Horan. The Mercer car 34, Hughie Hughes, went out for good in this lap, leaving only nine cars still running. Hughes' car was disabled by a broken gasoline line. Two laps previous to his withdrawal, Hughes' car threw a wheel at station 7, but controlled the car, keeping it on the road. Another wheel was substituted, his car being equipped with the wire type. Bragg averaged 67.5 miles an hour for the seventeen laps.

Through the twentieth lap nothing of note took place, although on the next round Bragg lost his lead, which he had held from the seventeenth lap. He was obliged to stop for gasoline and he changed both rear tires at the same time, losing in all 2 minutes. De Palma and Tetzlaff were both so close that they passed Bragg while he was stopped, putting the Cincinnati driver into third place, Tetzlaff into the lead again and De Palma second. Tetzlaff was also forced to change a rear tire, so that, in the twenty-second circuit, De Palma was leading, with Tetzlaff second and Bragg still third. The other cars maintained practically their same positions in the nineteenth, twentieth, twenty-first and twenty-second laps. De Palma, then leading, had averaged 72 miles an hour for twenty-two laps.

De Palma retained the lead through the twenty-fourth lap, with Tetzlaff second, Bragg third, Bergdoll fourth, Anderson fifth, Oldfield sixth, Clark seventh and Horan eighth. But in the next lap Tetzlaff succeeded in nosing De Palma out of first position, while the positions of the rest of the cars remained the same. De Palma had been forced to stop at the pit to change the left front tire and to take on water and gasoline. His pit stop consumed 2 minutes and 9 seconds. More delay at the pit on the twenty-sixth lap allowed Bragg to take second position from De Palma, while Tetzlaff was still in the lead. No change in the positions of the other cars took place in the twenty-sixth lap, nor in the next four laps.

In the thirty-first lap it was seen that something was wrong with Tetzlaff, who, since he had regained the premier position, had been going at a lively pace. Finally the car was seen coming down the track at a slow pace, and it was found that he was out of the race with a broken radius rod, practically repeating his performance of Wednesday in the Vanderbilt Cup race.

Bragg succeeded to first place again, De Palma second, Bergdoll third, Anderson fourth, Oldfield fifth, Clark sixth and Horan seventh. The rest of the race for first place was simply a struggle between Bragg and De Palma, Bragg with the newer car having the best of the argument. Bergdoll was third up to the forty-third lap, although there was plenty of excitement for the crowd in the closeness between this car and Anderson's Stutz, which was the only American remaining in the battle.

Through the fifty-first lap Bragg was leading De Palma by over 2 minutes, while Anderson was third, Bergdoll fourth and Oldfield fifth. In the last lap, after De Palma had gone into the ditch, second position went to Bergdoll and third to Anderson. Burman was driving for Horan up to the forty-eighth lap when the car was flagged by the officials.

Calendar of Coming Automobile Events

Shows, Conventions, Etc.

Jan. 2-10.....New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11.....Cleveland, O., Annual Automobile Show.
Jan. 11-25.....New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.....Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8.....Chicago, Ill., Annual Automobile Show.
Feb. 10-15.....Minneapolis, Minn., Annual Automobile Show.
Feb. 11-15.....Ottawa, Ont., Annual Automobile Show.
Feb. 17-22.....Kansas City, Kan., Annual Automobile Show.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....St. Louis, Mo., Annual Automobile Show.
March 3-8.....Pittsburgh, Pa., Annual Automobile Show.
March 8-15.....Boston, Mass., Annual Automobile Show.
March 17-22.....Buffalo, N. Y., Annual Automobile Show.
March 19-26.....Boston, Mass., Annual Truck Show.
March 24-29.....Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Oct. 14.....Reliability run, Iowa State Automobile Association.
Oct. 19.....Track, Brighton Beach, N. Y., Motor Dealers' Exhibit Company.
Oct. 21-25.....Reliability Run, Chicago Motor Club.
Oct. 24-26-27.....Track—San Antonio, Tex., San Antonio Auto Club.
Oct. 26.....Track—York, Pa., York Motor Club.
Oct. 26-28.....Los Angeles to Phoenix Road Race, Maricopa Auto Club.
Oct. 31.....Track—Phoenix, Ariz., Maricopa Auto Club.

Proposed Contests

Oct. 12.....Track—Salem, N. H., Rockingham Park Co.
Oct. 12.....Track—Springfield, Ill., Illinois State Board of Agriculture.
Oct. 12.....Interclub Run, Chicago Auto Club vs. Chicago Athletic Association.
Oct. 12.....Track—Poughkeepsie, N. Y., E. W. Powell.
Nov. 15-16.....Track—Richmond, Va., Richmond Automobile Club.
Oct. 19.....Track—Fort Smith, Ark., Fort Smith-Van Buren Auto Club.
Oct. 19.....Narberth, Pa., Frank D. Hall.
Nov. 3-5-6.....Track—Shreveport, La., Shreveport Auto Club.
Nov. 28.....Road Race—Visalia, Cal., W. H. Linton.
Oct. 26.....Track—White Plains, N. Y., Geo. T. Long.

MECHANICAL DETAILS AND SPECIFICATIONS OF CARS IN THE MILWAUKEE RACES

No.	Car	Driver	Bore	Stroke	Piston Displacement	Magneto	Carbureter	Shock-Absorber	Tires	Oil	Spark-Plugs
					VANDERBILT						
22	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michelin	Monogram	Bosch
23	Mercer*	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
24	Knox	Mulford	4.8	5½	597.0	Bosch	Rayfield	Mondex	Michelin	Oilzum	Bosch
25	Lozier	Nelson	5⅜	6	549.0	Bosch	Rayfield	Mondex	Michelin	Wadham	Bosch
26	Mercedes	Wishart	5⅛	7.06	590.0	Bosch	Rayfield	Mondex	Michelin	Monogram	Bosch
27	Stutz**	Anderson	4⅝	5½	389.9	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
28	Mercedes	Clark	5⅛	7.06	590.0	Bosch	Rayfield	Mercedes	Michelin	Mobiloil	Red Head
29	Fiat	Tetzlaff	5	6⅞	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
					GRAND PRIZE						
31	Benz	Burman				Remy	Benz		Firestone	Oilzum	Bosch
32	Lozier	Fountain	5⅜	6	549.0	Bosch	Rayfield	Mondex	Michelin	Wadham	Bosch
33	Fiat	Tetzlaff	5⅞	7⅛	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
34	Mercer*	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
35	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michelin	Monogram	Bosch
36	Mercedes	Wishart	5⅛	7.06	590.0	Bosch	Rayfield	Hartford	Michelin	Monogram	Bosch
39	Mercedes	Clark	5⅛	7.06	590.0	Bosch	Rayfield	Hartford	Michelin	Mobiloil	Red Head
40	Benz	Bergdoll	6.2	6.3	670.0	Bosch	Benz		Fisk	Oilzum	Bosch
41	Fiat	Bragg	5⅞	7⅞	850.0	Bosch	Rayfield	Mondex	Michelin	Monogram	Bosch
42	Benz	Horan				Bosch	Rayfield		Michelin	Monogram	Bosch
43	Stutz**	Anderson	4¾	5½	389.0	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
44	Fiat	Oldfield	5⅞	7⅞	850.0	Bosch	Rayfield	Mondex	Firestone	Oilzum	Bosch
					WISCONSIN MOTOR CHALLENGE TROPHY						
2	Mason Special	Snyder	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Michelin	Oilzum	
3	Mason Special	Mason	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Goodyear	Mobiloil	
5	Mason Special	Endicott	3⅞	5	235.8	Splitdorf	Schebler	Mondex	Michelin	Texaco	
					PABST BLUE RIBBON TROPHY						
11	Case	Nikrent	4 23–64	5	447.8	Splitdorf	Rayfield	Mondex	Michelin	Texaco	
12	Bergdoll	Rooney	4	5 1–16	406.5	Bosch	Rayfield	Hartford	Firestone	Texaco	Bosch
14	Mercer	Wishart	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
15	Fal-Special	Hastings	4⅛	5¼	280.6	Splitdorf	Schebler	Hartford	Michelin	Polarine	
16	Mason Special	Roberts	3⅞	5	235.8	Splitdorf	Schebler	Hartford	Michelin	Oilzum	Bosch
17	Mercer	Pullen	4⅝	5	300.7	Bosch	Rayfield	Hartford	Firestone	Monogram	
18	Fal-Special	Chandler	4⅛	5¼	280.6	Splitdorf	Rayfield	Hartford	Michelin	Polarine	
19	Mercer	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch

*Used Rudge-Whilworth wire wheels.
**Used McCue wire wheels.

The Automobile

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Contests Have Their Lessons

ROAD racing in America for 1912, which ended last week with the exception of the Desert race, has not done so much good to the American maker as in former years. Not because the lessons to be learned have not been in evidence but chiefly because the manufacturers have been conspicuous by their absence. 1912 has not been a manufacturers' year in road racing; rather it has been a year characterized by sporting car owners, who have entered their machines in different events for the sport of the affair and not because of any holdings they may have had in any company building machines. As is always the case there have been the exceptions, examples where manufacturers have thrown their entire energy into the contest and have come out with flying colors, carrying away laurels that have aided the engineering department and the selling organization.

That many American automobile makers have withdrawn from road racing and speedway racing for the present is and has been apparent but it is very problematic if next year does not see several of them equipping racing teams to campaign the entire country. This is assured in that every company that has gone into legitimate racing this season has reaped a good harvest. The expense of competition has been less than in any previous year: With educated drivers, the amount of practice work before any meet has been cut to the minimum.

There are hundreds of things that the American maker can learn from road racing. A few examples will suffice: There are several high-class, high-priced American machines in which it is necessary to have a service station man set the brakes in order to do the job properly; in fact, their salesmen recommend it. On the best foreign machines the brakes can be adjusted with the car travelling at its highest speed on the road. Here in itself is a lesson in accessibility that the American maker can carry to his own engineering department and work into his new models.

The foreigner is learning new lessons every year in racing. With him the days of bulk and power as the only means of victory are over. The race is not now to the biggest motor or the heaviest machine. Reduction in weight and efficiency in motor are now major factors. These have been made factors because the foreign makers have gotten together and revamped racing conditions according to the needs of the hour and the progress of the times.

When the long-stroke motor was in the spotlight he framed his regulations to test it. The looked-for lessons were learned and the industry profited. Now that smaller motors are desired by the entire country, now that lighter weight is being asked for, he has framed his regulations along these lines and will solve these problems.

In the meantime America is going on as she has been going on for three or four years, spending each successive season as "a tale that is told." There has not been any effort to frame regulations for contest that will measurably advance the industry. The manufacturer who wants to bring out his new machine with smaller motor, lighter weight and combining various other details has to do so at the anticipated expense of being a second-rater, knowing that the unlimited cylinder sizes of other makers will surely go against him. In spite of this handicap a few of our makers have shown progress, they are compelling attention and they are getting good results.

It is time that our manufacturers were awake to the situation. It is high time that they grasped the potentialities of well-conducted, well-regulated racing. Hundreds of lessons are still to be learned from it but if our manufacturers still claim not to have any time in which to sanely discuss engineering tendencies and formulate racing regulations which are not only in conformity with the trends of the years but which will also act as pioneering factors, then they should not aim so strenuously in avoiding the spirit of the rules and try to win at any cost.

It is absurd to spend thousands and tens of thousands in racing if the governing regulations are not in step with the development of the industry. If the public want racing, and their attendance at this year's races has shown that they do, then make this racing a value to the maker, a value to the dealer and a value to the spectator. This can be done.

Everybody is asking for a solution of long-stroke, weight as a factor, wire wheels *vs.* wood wheels, and many other questions. There is an opportunity for racing to solve practically all of these, but in order to do this, the racing rules must be revised each year in respect to those fundamentals that determine such points.

Waldon Defends The Annual Model

Packard Representative Declares It Evidences Progress Made in Industry and Meets Wishes of Public

Season Plan Is Also Treated—Greatest Problem, Says Speaker, Is Even Production Throughout the Year

S. D. WALDON, of the Packard Motor Car Company treated the subject of annual models before the recent convention of sales managers of the Automobile Board of Trade. Mr. Waldon presented the subject from the favorable point of view, showing the reasons that have actuated manufacturers in retaining the idea of annual models. Mr. Waldon's address was as follows:

The original "automobile season" opened with good driving weather in the spring and continued through summer and fall. Every maker produced his output so as to make deliveries during this period. The mechanical developments of the season were incorporated during the winter in the model to come out with the opening the next spring. This plan produced a tremendous demand at the opening of the season because it combined the natural demand of spring with the stimulated demand on account of the new vehicle with its improvements.

In those days we had the automobile show in the fall in an endeavor to prolong the season and to get business to tide the factories through the winter, but it did not work out that way. The only way to shorten the winter seemed to be to advance the opening of the season into it. This was done at about the rate of a month a year but with each advance toward midwinter the close of the preceding season seemed to keep its same distance ahead. There were always two influences combined to retard sales, in winter, the unfavorable weather and road conditions for the use of a new car on the one hand, and the fact that the new car of the fall would be made obsolete by the new one in the spring, on the other hand.

Moving the opening ahead to close up the dry spell might be likened to the cat that gets started chasing its tail, unconscious of the fact that its own approach withdraws the tail.

It was not until we had passed mid-winter and were opening the season in the fall months that the interval between seasons was materially reduced. The public purchased in the months from October to March because the vehicles were the newest models and with every latest improvement, and continued to buy through spring and summer because of good driving conditions. The year in this part of the country may for purposes of this discussion be divided into two equal sections. Six months, April to September, when conditions are favorable for the use of a new car, and October to March, 6 months in which the average purchaser is loath to break in the varnish of a new car in the mud and slush, and in a great many cases cannot be persuaded to take a demonstration. The 6 months from April to September are good driving months, and able to take care of themselves. The 6 months from October to March are unfavorable to automobiling, and need a stimulus if one is to be had.

The greatest gap between seasons occurred when the 6 months of winter weather preceded the offering of the new models in the spring, and the minimum gap when the 6 months of good driving weather is preceded by a new season, which opened in October.

When the new model appeared in the spring all the advantage of good driving weather was added to the stimulant of the new models and the demand was greater than could be cared for, then, but with a tapering off as winter approached, and with every argument against purchasing during the cold weather.

When the new model appeared in the fall it furnished its own incentive to purchase during the first 6 months of bad weather, and, of course, the good weather and roads of spring and summer carried the volume along almost to the opening of the new season. Opening the season at the commencement of winter gave the factory and dealers courage and enthusiasm to drive ahead with manufacturing and selling campaigns during the bad winter months.

How to run our factories on an even keel all the year round is the vital question before all of us and it seems to be best answered under the plan we have used in the past by not combining in the spring the two influences of new models and good weather and road conditions, thereby for a few months producing a pressure upon the factory that it is incapable of handling at that time, and with a subsequent reaction, but by keeping these influences separate and using the stimulant of the new goods at the beginning of winter to produce sales for dealer and factory alike through the 6 months of bad weather and with the natural driving season following to maintain a fairly uniform demand throughout the year.

The plan of selling by seasons grew out of necessity. Manufacturing economy demanded the largest possible factory orders that could be run through without change or interruption. Sales department efficiency demanded an up-to-date car, and mechanical developments were being made by all companies at such a rate that no one could afford to run longer than a year without calling a halt and introducing the improvements. A year was the smallest unit of time to satisfy the manufacturing department, and the longest unit the sales department dare give.

So long as radical and real improvements are made in motor cars so long will some such plan as we have all been working under be necessary to meet the requirements of both the manufacturing and selling end of the business.

There is no denying the fact that it is a big undertaking to change over a large factory from building one car or line of cars to another, and no company would go to the expense and trouble if it were not justified by the returns on the additional business obtained as the result.

When finality of design is reached and there is no opportunity left for genuine and marked improvement then we may all abandon the idea of yearly models and build the same article continuously. I say we may do it, because even after we reach a point where we build the same thing year after year it may be desirable to manufacture in blocks of one year's output.

The chief objections to those who oppose the season plan are wrapped up in the difficulty of accurately estimating the public's requirements as well as the developments of competition. The temptation to make the manufacturing run a little larger so as to secure greater production economy is always great, while sometimes the best laid plans are spoiled through competition educating the public to some other type of construction than you have to offer. The hardships of the season plan fall upon the company who for any reason has cars to sell that have been made obsolete by the new models of competition.

It would practically make no difference whether the industry were operating on the season plan by series, which amounts to about the same thing, or the continuous model plan.

A genuine improvement is a valuable selling asset and if made the most of through advertising by some prominent company immediately sets a new standard by which all cars are measured. It is not selling cars by seasons that should be criticised. The root of the objection is in the improvements that are made in the new models, that add to their value, and detract from all others.

Suppose that during the past 10 years we had been operating under the series plan. The result would probably have been just the same. Every manufacturer would try to make as many of one kind of vehicles as possible, probably a year's run. The same selling reasons would necessitate the introduction of improvements at not greater than yearly intervals. All would have been introducing their series at about the same time or trying to get out first with the general result of gradually advancing the opening date, and a convention at this time would probably be looking to obtain some change in the general scheme.

Suppose on the other hand the industry had had no set time for announcement but was split up into twelve divisions, each bringing out its new series in a different month of the year. All but one twelfth of the companies would have had obsolete models and there would always be the incentive for the purchaser to wait another month and see the next crop of new things.

In the last analysis any complaint against the season plan should be directed against the quantity of improvements, the rapidity with which they have been developed and the speed with which manufacturers have been obliged to work to keep abreast of the times.

If it were not for the changes what good or harm could the season plan do? Without improvements it is not a new model, and there is no stimulant for the prospect to buy.

The last 7 or 8 years we have been regularly confiding to ourselves that we could see the final car. We have always had this or that thing to add, and then the final car would be finished and might be manufactured without change for 5 years or more. But the new requirements that have been developed by the user have prevented us from ever catching up, and it is probable that the next 5 years will hold just as many improvements and the necessity for breaks in our manufacturing and selling for their introduction as we have had in the past.

A motor car is the most self-advertising article there is. It is as much a part of the owner as his clothes. It lends itself perfectly as a medium for the expression of his sense of beauty in color and form. More different trades contribute to its making than to any other popular article in the world, and every trade is an opportunity for improvement. With the automobile industry now standing fifth in size in the United States, with the great incentive to individual initiative on the part of every member of it, and what is even more important with the keen personal interest in the cars of some one of us, of every successful business man in the country, it will be surprising, to say the least, if the next 5 years fail to produce some startling improvements over our present vehicles.

We are all here to build up a good name and to make money, and both can be best done by giving the public what it wants.

Above all things the public wants evidence of progress, whether it be the same thing for less money or a better thing for the same price. The average buyer retains his car 3 to 5 years and then will buy again more or less readily, depending upon the advantages offered by so doing. The public has been educated too well by the last 10 years of the season plan and the addition of improvements by years to take kindly or quickly to any other basis. It is more of a task to go against the brute strength of such a combination demanding improvements by years than any individual maker cares to undertake, and it seems inevitable that the situation must be allowed to eventually solve itself through reaching an approximate finality of design.

It is perfectly certain that no matter what we may do on this subject in the way of resolutions and recommendations, each one of us will go home and do what he thinks is the best for his business.

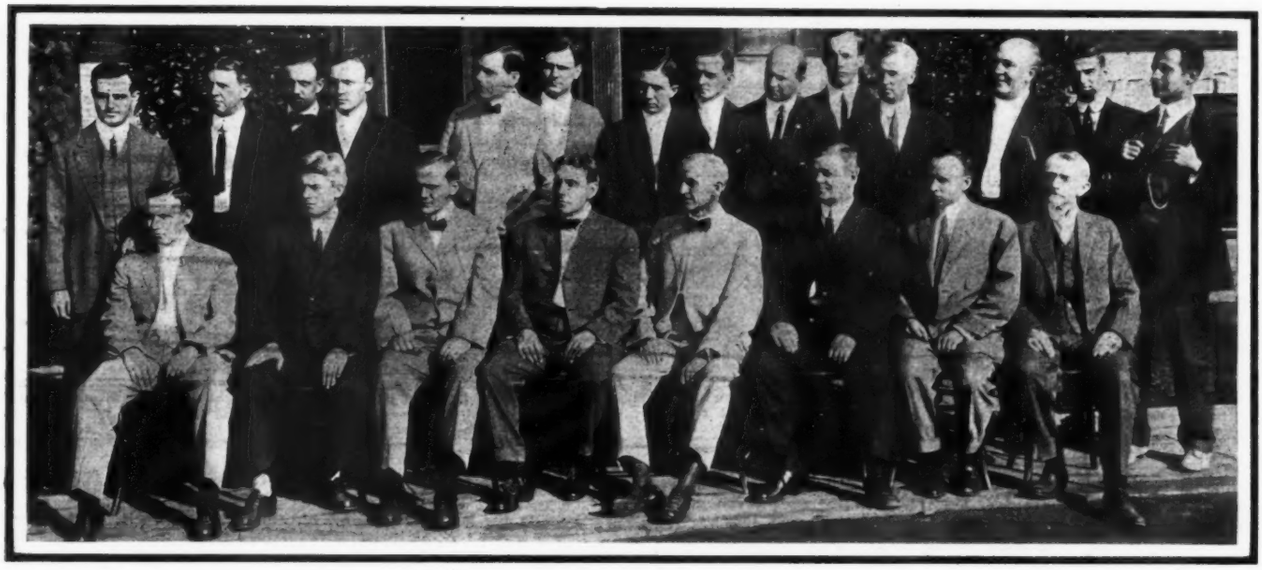
A well-known automobile company has run the same model for four years, practically without change. They have no patent on the plan and everyone else has a perfect right to do likewise, but if all the rest of the industry did the same, except one man who produced something new every year, that one man would have a tremendous advantage, which would not disappear until he had exhausted all opportunity for genuine improvement.

The season plan will have good cause for being so long as we continue to make marked improvements in our vehicles necessitating intervals of time for changing over our shops and permitting our dealers to clean up one output before beginning on the next. The season plan will cease to be just as soon as there are no marked improvements to make the new vehicles more desirable at the expense of the old and of others.

Arizona's New Law in Effect

PHOENIX, ARIZ.—The new state registration law is now in effect. Under its provisions every owner of a motor vehicle must register each machine in the office of the secretary of state. A complete description of each car, including the name of the maker, factory number, style and motor power, must be given. The registration fee is $5 for a machine of 40 horsepower or less, A. L. A. M. rating. The motorcycle tax is placed at $2. This law does away with city numbers, which have heretofore been the source of much confusion.

MONTREAL, QUE., Oct. 7—That Montreal's motor trade is in a flourishing condition, is evidenced by the automobile show which will take place in Montreal during the week of January 4-11. There will be two shows run concurrently, one at the Drill Hall, and the other in the Armory.



Gathering of the executive, sales and advertising staff of the Waverley Company at Indianapolis, Ind., to discuss the company's product

WAVERLEY Men in Conference—The executive, sales and advertising forces of the Waverley Company, Indianapolis, Ind., recently met in conference in that city to discuss the Waverley product and to devise means of accumulating data and opinions regarding special features and possible refinements from the entire sales organization.

Wilson Resigns—E. B. Wilson has resigned as general sales manager of the Poss Motor Company, Detroit, Mich.

Bus Line Opened—A motorbus line has been opened from Albany, N. Y., to New Salem, East Berne, Berne and Gallupville, N. Y.

Durval Branch Manager—W. D. Durval has been appointed branch manager of the Diamond Tire Company of Canada, in Toronto, Ont.

Ford Opens Branch—The Ford Motor Company has opened its Minneapolis branch and its St. Paul sub-branch. W. C. Anderson is manager.

Essenkay Invades Omaha Territory—The Essenkay Tire Filler Company has opened a salesroom at Nineteenth and Farnam streets, Omaha, Neb.

Sells 15,120 R-C-H Cars—Contracts for 15,120 R-C-H cars for delivery during the selling season of 1913 have been closed by the R-C-H Corporation since July 1.

Road Progresses Rapidly—Rapid progress is being made on the Hamburg-Buffalo, N. Y., brick road and it is expected the entire work will be completed in a month.

Cortland Club Erects Signs—The Cortland (N. Y.) Automobile Club has just completed erection on roadways of 325 signs in addition to 500 that were already up.

Ride for Incurables—The Ontario Motor League of Canada recently took the inmates of the Hospital for the Incurables around Toronto for their annual outing in automobiles.

Albany Officials Want Car—City engineer Lanagan of the Albany, N. Y., board of public works has made application to the city government for the installation in his department of an automobile for service of his employees who are summoned frequently to various parts of the city to make surveys and measurements.

Preparing Map of Ontario—The Ontario Motor League of Canada is preparing a new and accurate map of the Province of Ontario, showing new roads, old roads that have been improved, condition of the various highways, the material of which they are constructed—all these points being clearly indicated on the new map.

Opposition to the Automobile—With the extension of good roads into rural districts near Shreveport, La., where automobiles never have been seen before, there is some opposition to them being manifested by the ignorant classes. Obstructions have been placed on the roads and glass scattered.

Second Trip Around World—Joseph R. Drake, treasurer of the Hupp Motor Car Company, Detroit, Mich., who last year completed a trip around the world in the little Hupp car, started Wednesday noon from the Hotel Pontchartrain for a second and more comprehensive journey around the globe.

Arizona to See New Records—The Arizona Fair Commission has offered $600 to the driver who will lower the world's mile circular track record on the local track during the week of the state fair, beginning October 28, at Phœnix, Ariz. Barney Oldfield, Teddy Tetzlaff, Hughie Hughes and several others will start to beat the record on October 31.

Demonstration Tours to Officials Proposed—Demonstration tours are being recommended by the Ontario Motor League of Canada to its affiliated clubs, the plan being to take municipal officers, aldermen, reeves, and police officials for a complimentary ride to show them samples of bad roads and instances where traffic regulations could be immensely improved.

Automobile Factor in Strike—The strike on the Georgia Railroad, a small but important line connecting Atlanta with Augusta, has called the automobile into action again as a mail wagon. The Postmaster of Washington, Ga., has been making daily trips to Athens, Ga., by automobile for the mail and has been carrying with him each time cashiers of Washington banks, who were in dire need of ready money as a result of the beginning of the cotton movement.

South Bend Wants Fire Engine—Specifications for the $6,500 hook and ladder truck for the South Bend, Ind., fire department, which was provided for in the city's appropriations for next year have been approved by the board of public safety. Bids will be received up until the morning of Oct. 24; it is probable the contract for the improvement will be let at that time. The truck is to be equipped with a 70 horsepower engine and it must be able to develop a speed of 35 to 40 miles per hour.

New Agencies Established During the Week

PLEASURE CARS

Place	Car	Agent
Armington, Ill.	Franklin	H. L. Kampf
Aurora, Ill.	Franklin	C. C. Hinckley
Bath, Me.	R-C-H	H. Washburn
Birmingham, Mich.	R-C-H	G. C. Hupp
Bloomington, Ill.	Franklin	O. W. Walters
Boston, Mass.	Krit	F. E. Proctor
Champaign, Ill.	Franklin	J. L. Wiese & Son
Chicago, Ill.	Franklin	J. Hamwall Auto Co.
Columbus, O.	Abbott-Detroit	Snyder Auto. Co.
Columbus, O.	Maxwell	Shaw & Westwater
Columbus, O.	Metz	D. W. Short
Columbus, O.	Michigan	High-Seventh Garage
Columbus, O.	Packard	F. E. Avery
Columbus, O.	Premier	E. Miller
Columbus, O.	Reo	Columbus Auto Inn
Columbus, O.	Studebaker	C. E. Thomas Co.
Columbus, O.	White	C. E. Williams
Corsicana, Tex.	Cole	David Burke
Corsicana, Tex.	Krit	David Burke
Corsicana, Tex.	Paige-Detroit	Corsicana Motor Co.
Danville, Ill.	Franklin	J. B. Chambers & Son
Decatur, Ill.	Franklin	F. L. Winters
De Kalb, Ill.	Franklin	G. H. Dean & Co.
Fall River, Mass.	Franklin	F. W. Davis & Sons
Frankfort, Ind.	Franklin	Model Machine Works
Ft. Wayne, Ia.	Franklin	Ft. Wayne Iron Store Co.
Gadsden, Ala.	Oakland	K-E Auto & Electric Co.
Holyoke, Colo.	R-C-H	G. W. Garland
Iowa City, Ia.	Franklin	H. A. Knease & Sons
Indianapolis, Ind.	Lambert	Firestone Columbus Motor Car Co.
Jennings, La.	Buick	J. E. Parsons
Kankakee, Ill.	Franklin	Kewanee Garage
La Crosse, Wis.	Franklin	Elsen & Phillips
Manitoba, Can.	Marmon	Lion Auto Garage
Marion, Iowa.	Franklin	J. L. Ingram
Middletown, N. Y.	Franklin	Hotel Brown Garage Co
Mt. Bullion, Cal.	R-C-H	J. J. Youd
New Haven, Conn.	Marion	Ray Bishop Motors Co.
New Orleans, La.	Franklin	Myatt-Dicks Motor Car Co.
Niagara Falls, N. Y.	Ford	A. L. Noag
Norwich, Conn.	Maxwell	N. V. Porter
Peshtigo, Wis.	Buick	E. St. Peter
Phoenix, Ariz.	Krit	J. A. McCoodra
Phoenix, Ariz.	Reo	J. A. McCoodra
Reedsburg, Wis.	Overland	Sorge & Foss
Reedsburg, Wis.	Rambler	Sorge & Foss
Santa Rosa, Cal.	R-C-H	E. M. Dates
San Antonio, Tex.	R-C-H	C. H. Dean
Sausalito, Cal.	R-C-H	E. M. Dates
St. Louis, Mo.	Fiat	Lindsay Motor Car Co.
St. Louis, Mo.	Speedwell	Meyer-Busch
St. Paul, Minn.	Little	Smith & Heberle
Syracuse, N. Y.	Little	James Auto Co.
Syracuse, N. Y.	Hudson	James Auto Co.
Toronto, Can.	Abbott-Detroit	Central Garage Co.
Toronto, Can.	Rambler	C. A. Finzel
Vancouver, B. C.	Cole	B. C. Auto Co.
Washington, D. C.	Hudson	R. A. Klock
Washington, D. C.	Oakland	J. H. Earle
Washington, D. C.	Premier	Matheson Motor Co.
Washington, D. C.	Pullman	Henderson-Rowe Co.

COMMERCIAL CARS

Baltimore, Md.	Detroiter	Detroiter-Baltimore Co.
Baltimore, Md.	Universal	Colonial Motor Co.
New Orleans, La.	Garford	Garford Motor Car Co.
New Orleans, La.	Adams	Joseph Schwartz Co., Ltd.
St. Louis, Mo.	Commerce	Standard Auto. Co.
Toronto, Can.	Knox	Canadian Gen. Elec. Co.
Worcester, Mass.	Adams	Power Truck Sales Co.

Vaughan with Olds Company—Guy Vaughan, former engineer for Wyckoff, Church & Partridge, of New York, has joined the engineering staff of the Olds Motor Works, of Lansing, Mich.

Windsor Representing Chicago Firm—Mr. Harry A. Windsor has been appointed Detroit representative for the Fulton-McCutchan Company, of Chicago, Ill., with offices in the Majestic Building.

Dayton Undertaker Uses Automobiles—R. R. Whitmer, of Dayton, O., is the first undertaker in that city to adopt the automobile for funeral purposes and has conducted automobile funerals in many surrounding cities.

Oakland Factory Branch Opened—A factory branch of the Oakland Motor Company has been opened at New Orleans, La. W. C. Gray is in charge of the new agency, which has secured quarters at 745 Baronne street.

Warren's New St. Louis Building—The Warren Automobile Company, local agent for the Warren line in St. Louis, Md., is erecting a new building on Locust street in the center of automobile row. It will be used as a show and salesroom.

Milwaukee Awards Truck Contracts—The board of public works of Milwaukee, Wis., has awarded the contract for furnishing complete two new motor police patrol cars to the Charles Abresch Company, of Milwaukee, at approximately $7,500.

Giving Instructions on Russell Knight—The accompanying illustration shows the branch managers, salesmen and officials of the Russell Motor Car Company, Toronto, Ont., being instructed by Engineer Evans in regard to the new 6-cylinder Knight motor.

Boston Buys Another Truck—On the recommendation of Sealer of Weights and Measures Wooley, of Boston, Mayor John F. Fitzgerald signed an order granting the department permission to purchase a Kelley truck for city use in transporting the scales and sealing apparatus around Boston.

Colorado Springs Receives Park—The Garden of the Gods today has been formally presented to the city of Colorado Springs and dedicated to the use of the entire world. Honor was paid to the memory of the late Chas. E. Perkins, whose children and heirs carried out his wishes that the great natural park be preserved to the people.

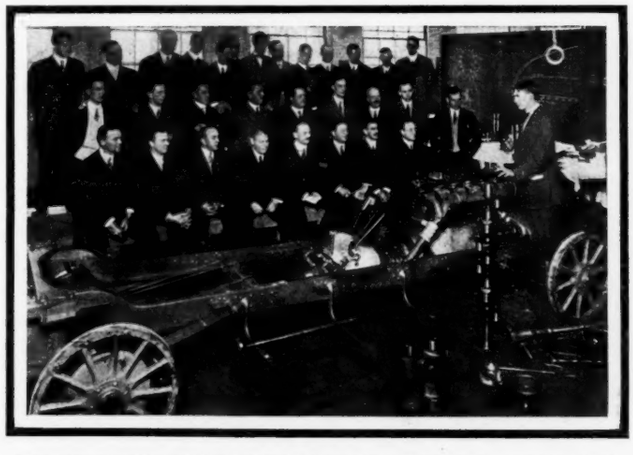
Baker Electric's Convention—A convention of the Baker electric dealers and salesmen will be held in Cleveland, O., where the Baker Motor Vehicle Company is located, October 16, 17 and 18. About one hundred and fifty Baker dealers and salesmen will convene. There will be shown for the first time the new coupé model, which has just been announced.

Pierrepont with Wisconsin Company—Robert Pierrepont has accepted the position of factory manager of the Wisconsin Motor Manufacturing Company, of Milwaukee, Wis., which builds a line of motors for pleasure cars and trucks and has a large plant occupying nearly 10 acres at Forty-fourth and Burnham streets, just west of the Milwaukee city limits.

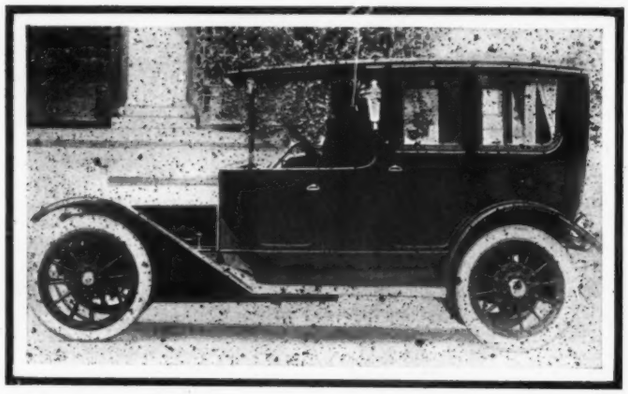
University Teaches Automobile Engineering—The University of Missouri at Columbia, Mo., is to teach students how to assemble, construct, operate, care for and repair automobiles. H. B. Shaw, Dean of the School of Engineering, has announced this new course as elementary automobile engineering. Lectures and laboratory work will combine this course.

Nashville to Mammoth Cave Tour—Twenty-five cars made the tour from Mammoth Cave, in Kentucky, to Nashville, Tenn., in connection with the Tri-State good roads convention, which was held at Mammoth Cave recently. The party inspected several classes of roadway and had an opportunity to examine the work after having been in use several years. The visitors were entertained at The Hermitage, the old homestead of Andrew Jackson.

Marmon's Hundred Century Run—Ten thousand miles in 100 running days is the feat to be attempted by the Marmon's Hundred Century car which left Indianapolis, Ind., Wednesday, October 2, on a remarkable touring test. The Hundred Century car is a new Marmon 32 touring car and is the property of Mr. M. L. Templeton, of Indianapolis, who will pilot the car on its hundred century jaunt. Mr. Templeton is accompanied by his wife and by Mr. and Mrs. J. G. Boston.



Sales organization of the Russell Motor Car Company, Toronto, Ont., receiving instruction on the six-cylinder Knight motor



New limousine of the Mercer Automobile Company, Trenton, N. J.

New Branch Manager—M. E. Gamble has been appointed manager of the Boston branch of the Universal Motor Truck Company.

Vail Makes a Change—Edward L. Vail, Boston, Mass., has accepted a position as sales manager and traveling representative for the Hoffecker Speedometer.

Leominster Club Posts Signs—The Leominster, Mass., Automobile Club has been busy recently posting signs under the direction of Dr. H. Porter Hall.

Establish Branch at Lexington—The Kentucky Automobile Company will establish a branch at Lexington, Ky. Work on the new structure in that city has already been started.

Havers Moves in Boston—The Boston agency of the Havers Six has moved into new quarters at 121 Massachusetts avenue, recently vacated by the Roberts & Sherburne Company.

Maine Number Plates—Cyrus W. Davis, Secretary of State, is preparing bids for the 1913 number plates to be used by Maine automobilists next year. The number ordered for this year was 10,000.

More White Trucks for Canada—Seven more White Motor Trucks have been delivered to the Hudson Bay Company for service in their departmental stores at Winnipeg, Calgary, and Vancouver, Ont.

Correction on Santa Monica—In THE AUTOMOBILE for September 26 it was stated that a National car won the Santa Monica race of 1909. This was a typographical error as the National won this race in 1911.

Top Company's Detroit Store—The National Top & Curtain Company, Detroit, Mich., organized to handle Jiffy curtains, has just announced the opening of a store on upper Woodward avenue, near Willis.

Beloit Boosters Go to Milwaukee—Two hundred Beloit boosters drove to Milwaukee, Wis., on October 2 in 40 cars to spread the gospel of Beloit products and good roads along a 70-mile trail to the Wisconsin metropolis.

Goes into Garage Business—J. Mavor, lately distributing agent in Western Canada for the Halladay automobiles, has given up this agency and opened a garage and repair shop in the Western portion of Winnipeg, Ont.

Detroit Show Space in Demand—Space for the Detroit, Mich., automobile show next winter is already in demand, judging by the applications received by Manager Walter Wiimot. More space will be required this year than last.

Lowell to Have Fire Trucks—At the last meeting of the Lowell City Council an order was passed appropriating $16,000 for the purchase of three motor chemical engines and hose wagons for the fire department to add to the motor equipment.

Winnipeg's Highway Convention—The interest in the Canadian Highway Convention, which takes place in Winnipeg, Ont., October 9 to 12, is rapidly growing, and it is now probable that over 400 delegates will be in attendance from the Western Provinces.

New Montgomery Traffic Ordinance—To prevent interference with traffic automobile and hack stands have been designated by the Montgomery, Ala., authorities. Automobiles and other vehicles will not be allowed to stand at the curb at places other than those designated.

Stuart Going West—George L. Stuart, one of the first motor dealers in Portland, Me., who handled the Cadillac there until recently when he sold out his interest in the agency, has decided to move to Los Angeles, Cal., with his family where he will go into business shortly.

Automobile Hinders Real Estate Business—Real estate men in Montgomery, Ala., are blaming the automobile for the alarming decrease in the sales of city property. They say that young men who a few years ago invested their surplus money in properties now are buying automobiles.

Louisiana's Road Improvement—One hundred thousand dollars is to be spent at once on rural roads immediately east of New Orleans, La. This provides for a network of improved highways that will add materially to the territory that can be reached by automobile from that city.

Cropler Establishes Tire Branch—F. S. Cropler, for several years connected with the old G & J clincher tire people, has taken over the old Federal Tire agency in St. Louis, Mo., and has established a factory branch there. This factory branch will be the distributing point for the Southwestern States.

Springfield Club Elects Officers—The annual meeting of the Springfield, Mass., Automobile Club was held recently at the Hotel Worthy and the secretary reported that the association was in a flourishing condition. He stated that 87 new members had been added to the club's roll during the year, making the membership now 345.

New Mercer Limousine—The Mercer Automobile Company, Trenton, N. J., has brought out a limousine known as type 35 E. This car is shown in the accompanying illustration. It is built on the regular Mercer 35 AB chassis, and unlike the ordinary limousine, it presents a very low appearance. An idea of its height can be judged from the fact that a man a little taller than the average can stand on the curb and look over the top. It has a wheelbase of 118 inches.

Indianapolis to Have Garage—Indianapolis, Ind., within a short time, excepts to have one of the finest municipal garages in the country. A conference of city officials was held recently, and, as a result, City Controller Harry R. Wallace consented to recommend to the city council a bond issue of $110,000. Of the amount that will be received from the sale of the bonds, $40,000 will be used in erecting a municipal garage. The fire headquarters, which will cost $70,000, will be equipped with motor apparatus.

Automobile Incorporations

AUTOMOBILES AND PARTS

BENTON, ILL.—Benton Motor Car Company; capital, $65,000; to deal in automobiles and accessories. Incorporators: H. Stotlar, W. S. Cantrell, A. H. Fraunfelder.

CHICAGO, ILL.—Metzger-Herrington Argo Company; capital, $50,000; to deal in automobiles, motors and vehicles. Incorporators: C. J. Metzger, B. F. Brady, R. A. Herrington.

CINCINNATI, O.—Federal Motor Supply Company; capital, $250,000; to deal in automobiles and accessories. Incorporators: G. W. Platt, E. C. Schmitt, R. L. Dollings, A. M. Draddy, M. F. Platt.

CLEVELAND, O.—Cadillac Automobile Company; capital, $50,000; to deal in automobiles and accessories. Incorporators: T. B. Bolton, W. H. Marlatt, F. H. Pelton, E. Jenkins, E. D. Hayes.

DETROIT, MICH.—Traveler Motor Car Company; capital, $10,000; to deal in automobiles and accessories. Incorporators: W. J. McIntyre, Joseph P. McIntyre, Joseph Lavigne, William L. Kenfield.

LACROSSE, WIS.—Parket-Hirt Company; capital, $5,000; to deal in motor cars and accessories. Incorporators: E. W. Parker, Joseph F. Hirt, Harriet E. Parker.

MENOMINEE, WIS.—D. F. Peyer Company; capital, $75,000; to manufacture automobile trucks. Incorporators: D. F. Peyer, F. J. Trudell, Harry S. Emerson.

NEWARK, N. J.—Ka Dix Newark Motor Truck Company; capital, $100,000; to manufacture commercial and fire fighting trucks. Incorporator: G. F. Kallberg.

NEW YORK CITY, N. Y.—New York Electrical Vehicle Association, Inc., capital, $50,000; to deal in motor vehicles. Incorporators: George Tierman, Frank H. Parcello, Robert G. Redlefsen.

NEW YORK CITY, N. Y.—Used Car Company of New York; capital, $5,000; to deal in automobiles. Incorporators: Andrew F. McNamara, Gustavo Galiani, Jacob J. Kramer.

NEW YORK CITY, N. Y.—Viking Manufacturing Company; capital, $25,000; to manufacture automobiles. Incorporators: R. Condon, A. O. Briggs.

PATERSON, N. J.—Standard Auto Company; capital, $2,500; to engage in the automobile business. Incorporators: Christian Braun, William F. Drexler, Henry Stoeher.

RACINE, WIS.—Wallis Tractor Company; capital, $300,000; to manufacture farm tractors. Incorporators: W. C. Quarles, Markey Wells.

ROCHESTER, N. Y.—Electric Car Sales & Service Company; capital, $10,000; to deal in electrical motor vehicles and equipment. Incorporators: Max Bernstein, Minnie L. Bohrer, Glenn H. Leaty.

TORONTO, CAN.—Standard Motors Company, Ltd.; capital, $40,000; to manufacture automobiles. Incorporators: George S. Skinner, Harry N. Newman, George P. McHugh.

TORONTO, CAN.—Toronto Electric Motor Car Company; capital, $300,000 to manufacture motor cars. Incorporators: James A. Riordans, Albert E. Adams, Edward C. Coleman.

To Motorize Douglas Fire Department—Fire Chief W. J. Nemock has recommended to the Douglas, Ariz., council that automobile tractors be substituted for the horses now used to draw fire engines.

Has New Quarters—The Day Automobile Company, handling the New Orleans, La., agency for the Paige-Detroit and the Alco companies, has moved into new quarters on Rampart street.

Ford at Rochester Expands—Thomas J. Northway, local Ford distributor, at Rochester, N. Y., has completed plans for the construction of a three-story steam-heated salesroom to cost $12,000.

To Collect Mail—Two automobiles will soon be put in use for the collection of mail, in Omaha, Neb., if the proper machines can be secured at a price satisfactory to the post office department officials.

Coal Men Use Trucks—Retail coal men are figuring on utilizing the motor trucks in Minneapolis, Minn., due in part to the uncertainty regarding teamsters and also because horses are difficult to buy at present.

Cox Heads Fordham Company—G. F. Cox was appointed on Saturday, Rochester, N. Y., manager of the Fordham Company, recently organized with capital of $3,000, for the purpose of manufacturing motor vehicles.

Present for Buffalo Club—The Buffalo Electric Vehicle Company presented recently to the Country Clubhouse of the Automobile Club of Buffalo, N. Y., a charging plant capable of recharging three automobiles at one time.

Washington Dealer Changes Name—The Auto Exchange & Supply Co., 1722 Fourteenth street, Washington, D. C., N. W., has changed its name to the Washington Car Equipment Co., and will shortly remove to larger quarters.

Rochester Builds Police Garage—Work was begun last week on the construction of the Rochester, N. Y., police garage. The building was staked out and Contractors Crossett & Lloyd planned to start immediate construction.

To Sell Rotary Valve Motor—The Parker Motor Company of this city has been formed to promote the sale of a rotary valve motor which is the invention of Victor C. Parker, formerly with *Modern Power*, of Winnipeg, Canada.

Camillus-Elbridge Road Open—The Automobile Club of Syracuse, N. Y., announces that the Camillus-Elbridge state road is open, which means that a continuous stretch of state highway now extends from the West Camillus hill to Auburn.

Pullman Packard owned by U. H. Dandurand, of Montreal, Que.

Duluth Club Active—The Duluth Automobile Club, Duluth, Minn., has started a roads campaign. It is laying out a new Twin City-Duluth road, which is to reach from Sandstone, the half-way point, through Superior, instead of direct to Duluth.

Lockport After Speeders—Lockport, N. Y., fell in line last week with the ordinance limiting the speed of motor vehicles in the city limit to 15 miles an hour. Signs have been posted in conspicuous roads and arrests under the law can now be prosecuted.

Studebaker Men Meet—About thirty branch managers and officers of the Studebaker Corporation met at a dinner recently at the Pontchartrain Hotel, in Detroit, Mich., the occasion being the annual meeting for the discussion of the coming season's campaign.

Hudson Agency Moves—Increased business has made it necessary for the Hudson agency in New Orleans, La., to occupy more spacious quarters. A completely equipped repair shop has been installed in connection with the new sales rooms at Baronne and Perdido streets.

Clubs in Canadian League—The Ontario Motor League has to date affiliated in its organization eleven automobile clubs in the province which are as follows: Aylmer, Brantford, Chatham, Hamilton, Kingston, Niagara Falls, Ottawa, Peterboro, Stratford, St. Catharine's and Woodstock.

Ohio Road Report—The Ohio State Highway Commission has made a report showing the progress made in the improvement of the highways of the state up to date. During the year road construction has been accomplished to the extent of $1,122,060.97. The total length is 658,046.4 lineal feet.

Omaha Show Draws Visitors—Ak-Sar-Ben week and the fall garage show of the Omaha automobile show brought hundreds of visitors to Omaha, Neb. All of the garages were prettily decorated in Ak-Sar-Ben colors and in the colors of the show association, green and white. Most of the dealers had a complete line of their 1913 models on display.

Good Roads Convention at Birmingham—Delegates from all parts of the state are assembling at Birmingham, Ala., for the annual convention of the Alabama Good Roads Association. The Birmingham Motor Club is cooperating with the local Good Roads Association in directing the affairs of the convention. Three hundred delegates are expected.

Express Company's Packard Order—A significant step in the conquest of local transportation by the power vehicle is the order recently placed by Wells, Fargo & Company with the Packard Motor Car Company for 100 motor trucks of 2-ton and 3-ton capacity. These trucks, costing $286,750, will be used to supplant the express company's horse-drawn wagons in the larger cities of the United States.

Luxury in Automobile Travel—U. H. Dandurand, of Montreal, Can., has succeeded in getting luxury in motor travel, together with independence from hotels, by using a Pullman Packard. On a 3-ton Packard truck chassis has been mounted a body whose interior arrangement is similar to that of a private railroad car. Twenty-five persons are easily carried on short trips and for long journeys there are accommodations for the comfort of eleven, including chauffeur and cook. The accompanying photograph shows the truck.

Automobile Incorporations

GARAGES AND ACCESSORIES

CLEVELAND, O.—Service Garage Company; capital, $10,000, to deal in automobiles and accessories and to operate a general garage. Incorporators: Roy J. Ramson, Karl W. Volk, Fred Desberg, Walter McMahon, John W. Willdis.

COLUMBUS, O.—J. C. Sherwood Rubber Company; capital, $20,000; to deal in all kinds of rubber tires. Incorporators: John C. Sherwood, William S. Sherwood, Robert C. Creppen, Parnell J. Cull, Charles L. Creppen.

DALLAS, TEX.—Hazoline Auto Supply Company; capital, $10,000; to sell automobile accessories. Incorporators: Edwin Hobby, Forrest E. White, J. W. Crotty.

DAYTONA, FLA.—Daytona Auto Supply Company; capital, $1,000,000; to sell automobile accessories. Incorporators: A. G. Munt, H. C. Thompson.

LOUISVILLE, KY.—McPherson Automobile Company; capital, $10,000; to engage in the automobile repair business. Incorporators: Franklin McPherson, Catherine McPherson, Olive McPherson.

NYACK, N. Y.—Nyack Garage, Incorporated; capital, $15,000; to engage in the garage business. Incorporators: Alan Leggett, John J. Laine, Paul J. Douboise.

SHEBOYGAN, WIS.—Wald Manufacturing Company; capital, $30,000; to deal in automobile accessories. Incorporators: Ewald F. Pawsat, Herman Pawsat, Felix Benfy.

ST. LOUIS, MO.—Lewis Automobile Company; capital, $26,000; to conduct a garage and general repair shop. Incorporator: H. D. P. Lewis.

TORONTO, CAN.—Bulldog Tire Company; capital, $300,000; to manufacture tires.

WHITE PLAINS, N. Y.—General Rim Company; capital, $150,000; to supply motor vehicles and accessories. Incorporators: William Kuhl. Robert W. Ashley, Frank Oberkirsch.

CHANGES OF NAME AND CAPITAL

AKRON, O.—Buckeye Motor & Cycle Company; increase of capital from $5,000 to $15,000.

BALTIMORE, MD.—Hupp Motor Car Company; increase of capital from $500,000 to $750.000.

DETROIT, MICH.—Haves Manufacturing Company; increase of capital from $500,000 to $750,000.

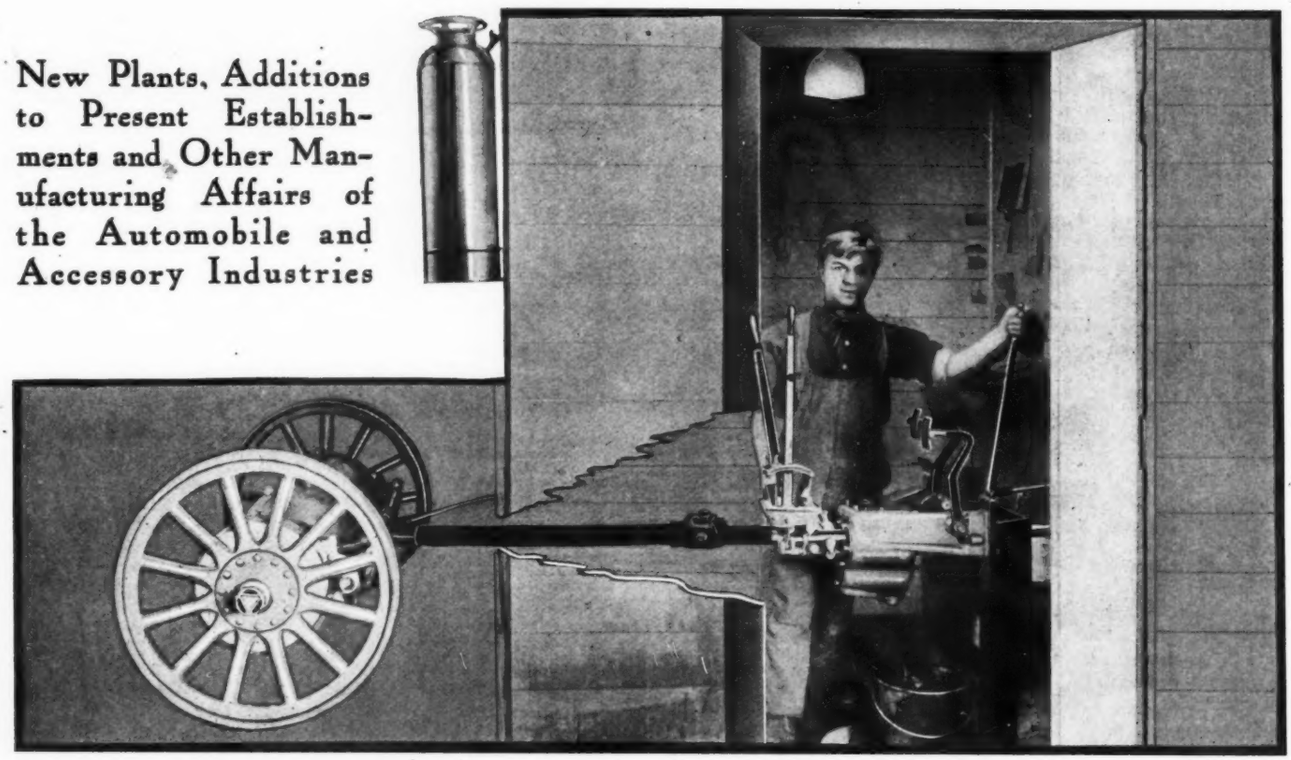
DETROIT, MICH.—Kelsey Wheel Company; increase of capital from $500.000 to $1,000,000.

LOUISVILLE, KY.—Kentucky Automobile Company; increase of capital from $24.000 to $65,000.

WAUKESHA, WIS.—H. L. Kenyon Company; increase of capital from $100,000 to $200,000.

Factory Miscellany

New Plants, Additions to Present Establishments and Other Manufacturing Affairs of the Automobile and Accessory Industries



Showing soundproof vault employed for testing differential and transmission gears by the Hudson Motor Car Company, Detroit, Mich.

It is impossible for a tester to do good work with the din of a machine shop surrounding him. To successfully cope with this situation and allow the tester to train his ears to detect the slightest sound which would indicate that the gears in the differential and gearset were not working as they should, the Hudson Motor Car Company, Detroit, Mich., has erected a sound-proof vault in which this part of the work is carried on. The drive mechanism is mounted on the special frame shown in the illustration and the clutch arranged so that the power can be applied when desired. The shaft which drives the mechanism enters from the exterior of the vault, passing through the wall resting in a bearing at that point. One man can operate the mechanism and is sufficient for the testing work. The length of time in the testing work will vary but twenty sets of differentials and gearsets can be tested in a working day. The gears can be shifted in the usual manner and the silent running of all gears is assured by the fact that the noisy ones are not permitted to pass through the test in the silence chamber.

GOODRICH Company's Recent Addition—Although the present floor space of the Goodrich Tire Company, Akron, O., is between 60 and 70 acres, this is at present being augmented by the new building which is shown in the above illustration. This structure of six stories and basement is 270 feet long and 157 feet wide.

Lewis Company in Detroit—The Lewis Spring & Axle Company, Jackson, Mich., has moved its control department to Detroit, Mich., with headquarters in the Boydell Building. Fifty men will be employed.

Supplies DeTamble Windshields—The Columbus Automobile Parts Company, Columbus, O., has closed a contract to supply the DeTamble Motor Car Company, Anderson, Ind., with windshields for the 1913 cars.

Century Electric's New Quarters—The Century Electric Motor Car Company, Detroit, Mich., has removed its factory to the new building erected by the company at Woodward and Lathrop avenues and has started work with two shifts, night and day.

Wagon Company to Make Trucks—The Tiffin Wagon Works of Tiffin, O., is preparing to enter the field of motor truck manufacturing and expects to place a line of trucks on the market in the spring. Agents have already been signed up to market the trucks.

Tudhope Company Moves to Windsor—The Tudhope Motor Company, Orillia, Ont., Canadian manufacturers of the Flanders Six, which was formerly known as the Everitt, will move to Windsor, Ont., shortly. Recently a site for a new factory was bought. The change will bring the concern much nearer to the Flanders Manufacturing Company of Detroit, Mich.

Hudson Factories Double—The Hudson Motor Car Company, Detroit, Mich., has factory floor space of 172,811 square feet. Last winter a new factory was added, bringing the total to 236,411 square feet. There will now be added two more plants, bringing the total floor space up to 363,611 square feet.

Lowell to Have Tire Plant—The Patterson Rubber Company, a Massachusetts corporation with a capitalization of $500,000, has decided to locate at Lowell, Mass., where five buildings will be erected and the company will soon begin the manufacture of automobile tires. About 1,000 employes will be put to work. John S. Patterson, of Providence, R. I., is president of the new concern.

Eight New Overland Buildings—The Willys-Overland Company, Toledo, O., has eight new buildings in process of construction at the Toledo plant. The largest of the group is a five-story concrete building, 102 feet by 127 feet in size. The others range from 34 feet up to 60 feet by 48 feet up to 216 feet in dimension. These buildings represent an outlay of several hundred thousand dollars and when finished will house 2,000 extra workmen.

Toledo Truck Company Building—The Toledo Motor Truck Company, Toledo, O., is building a one-story brick and structural steel building, which will be 54 feet by 236 feet in size.

Goodyear Works Night and Day—Due to increased business of the Goodyear Tire & Rubber Company, Akron, O., it will be necessary to keep the factory going night and day for some time.

New White Plant—The new factory of the White Motor Car Company, Cleveland, O., will be ready for occupancy about December 1. This new structure will be 240 feet by 160 feet in size.

Krebs Purchases Elmore Plant—The Krebs Motor Company, Clyde, O., has purchased the old plant of the Elmore Automobile Company. B. A. Becker is president of the Krebs Company.

Ford's New Assembling Plant—The contract for the new assembling plant of the Ford Motor Company, Detroit, Mich., in Memphis, Tenn., has been awarded and the estimated price is $176,000.

New York's Fifty-six Automobile Factories—According to the last United States census New York City has fifty-six automobile factories. In 1899 there were only three, with a combined output of $6,194,000.

Manhattan Rubber's Addition—The Manhattan Rubber Manufacturing Company, Passaic, N. J., has awarded contracts for an addition to factory building "F", which is to be 70 feet by 90 feet in size.

Tires to Be Made Soon—Tyer Rubber Company, Andover, Mass., has its new addition nearly completed and in a couple of weeks the company will be manufacturing tires of all kinds for motor vehicles.

Apperson in New Deal—Elmer Apperson is head of a new concern that has been organized to make the Wilson Never-Miss self-starter of the compressed air type. A new plant will be erected at Kokomo, Ind.

Ford's Proposed Denver Plant—The Ford Automobile Company, Detroit, Mich., is reported to have secured a site on Broadway and Exposition avenue on which to erect an assembly plant four stories high.

Factory Manager Quits—The resignation of Benjamin A. Rhodes, as general superintendent of the Stoddard-Dayton Automobile Company plant, was recently announced. The resignation takes place at once.

Equipment Company Erecting Factory—The American Auto Equipment Company, Toledo, O., maker of automobile trimmings, will erect a large new factory and will be in the market for new tools, etc.

Hudson's Fireproof Building—The Hudson Motor Car Co., Detroit, Mich., has let the mason and concrete contract for the erection of a new fireproof factory building on Jefferson avenue. It will cost $50,000.

Morton at Chalmers Factory—Robert L. Morton, manager of the Keystone Motor Car Company, Harrisburg, Pa., left for Detroit, Mich., recently to arrange for shipments of Chalmers cars to meet the present demand.

Niagara Company's Dunkirk Plant—The Niagara Gasoline Motor Company of Buffalo, N. Y., has acquired a site and will immediately erect a new large plant for the manufacture of gasoline engines at Dunkirk, N. Y.

Northway Company's Plant—The Northway Motor Company, Detroit, Mich., has let contracts for an addition to the plant, to be three stories high and to be 50 feet by 104 feet in size. The building will cost $32,500.

Pump Company Moving to Buffalo—The Automobile Pump Company, Springville, N. Y., is moving its plant from that place to Buffalo, N. Y. Most of the employes will move to Buffalo and continue in the Pump company's employ.

Edwards Adds Longest Plant—The Edwards Motor Car, Louisville, Ky., has taken over the motor truck plant of the Longest Brothers Company, of that city, and will enlarge it. C. G. Stoddard and H. J. Edwards, New York City, are interested.

Miller Rubber Company Active—Increasing demand for tires, rubbers and reliners for automobiles at the O. K. Vulcanizing Works, Binghamton, N. Y., has necessitated the doubling of stock of rubber goods made by the Miller Rubber Company, Akron, O.

Eclipse Machine Company's Addition—Plans have been completed for the construction of an addition, 125 feet by 60 feet, to the plant of the Eclipse Machine Company, Elmira, N. Y. The addition will be of brick and steel construction and will provide additional room for more machines and also a factory store-room. The Eclipse Company makes automobile screw machinery for automobiles.

Continental Equips New Factory—The Continental Motor Company, Ellicott Square Bldg., Buffalo, N. Y., has leased a plant and will equip it with machinery for the manufacture of automobiles and motor trucks. Frank V. Whyland is general manager.

Lamp Company Builds Addition—The Guide Motor Lamp Manufacturing Company, Cleveland, O., is laying plans for a new factory addition. The building will be 50 feet by 120 feet in size, two stories high, and will be built of brick and reinforced concrete.

Ex-Cel Truck Company's Factories—The Ex-Cel Motor Truck Company, Jamesburgh, N. J., has awarded contracts for the construction of its new plant. It will consist of five factories, each one story high, and 50 feet by 100 feet in size. The estimated cost is $35,000.

Buick Insure Its Employes—The Buick Motor Company, Flint, Mich., has taken out a policy under the new compensation law, which will cover all expenses incurred in every accident. This includes physician's and hospital services for three weeks in case of every accident.

Goodyear Planning New Plant—The Goodyear Tire & Rubber Company, Akron, O., is planning to erect an addition to its plant. The new building will be 250 feet by 60 feet in size, and five stories high. The cost will be $150,000. This will be the third large structure erected by the company during the present year.

Guests of Packard Company—Representing the commercial organizations of forty-five nations, the members of the International Congress of Chambers of Commerce were guests of the Packard Motor Car Company at luncheon in the plant in Detroit, Mich., Thursday, October 3, and made a complete inspection of the big motor car factory.

Chicago Manufacturer Moves to Marinette—The Chamber of Commerce of Marinette, Wis., has practically closed negotiations with a large manufacturer of motors for pleasure and commercial cars, now located at Chicago, for removal to Marinette. The Chicago concern is given a bonus in the form of a site for a factory and a suitable structure in which manufacturing operations may be carried on for the present, and during the construction of a new plant. It is stated that the Chicago concern awaits formal organization and incorporation upon the successful completion of negotiations with Marinette commercial club.

New Starter Factory—The Merralls Starter Company has been organized in Detroit, Mich., with a capital stock of $150,000 to manufacture a compressed air type of starting apparatus, which is the patented invention of W. A. Merralls. It has not been definitely decided as yet whether the concern will locate here or in the East, but in all probability Detroit will be chosen. It is proposed by the new concern to erect a two-story factory to take care of an output of about ten starters a day. Plans for such a structure have been made and they call for a building measuring 60 by 160 feet.

Latest addition to the plant of the B. F. Goodrich Company, Akron, O.

J-M Two-Ring Demountable Rim; Star Headlight; Rebound Check and Shock-Absorber for Ford Cars; Brackets for Carrying Plates on Fords; Handy Fire Extinguisher; Clockless Time-Recording Stamp

LaMay Chemical Extinguisher

DEMOUNTABLE rim consisting of two rings and fastened to the wheel at five points in the latest addition to the manifold line of the H. W. Johns-Manville Company, New York City, which is now being offered to the automobile public after extensive tests carried on with this device have been completed.

The illustrations here given show the rim in place on the wheel and off the same, ready for changing a tire. The rim each ring of which is formed with a flange forming a base for the tire bead to be pressed against, is secured to the wheel in the manner seen in Fig. 1, by the use of clamps C. These clamps grip the recess R formed between the innermost portion of the rim and the bead flange formed on the outer side of the wheel, so that when the nut N is turned tight on its bolt piercing the wooden felloe, the portion P of the rim is pressed toward the inner side of the wheel. The felloe band being tapered does not permit the rim to come off toward the center of the car. The rim itself, as stated before, consists of a continuous ring R1, Fig. 2, and a split ring R2, fitting inside the ring R1 and being secured near its ends by holes engaging studs which project from the inner surface of R1. The openings O in both rims are provided for the tire valve.

The *modus operandi* in mounting and demounting rim, as well as the tire on the same, is very simple, and this work may be done with a good deal of speed, due to that factor as well as to the light weight of the rim, which is made of cold-rolled steel. When the rim is in place on the wheel the clamps press upon the recess R of the rim, as shown by the examples of C and C1 in Fig. 1. To release the rim from the wheel the special J-M combination tool is applied to the nut N holding the clamp C in place and, operating always on the clamp occupying the highest position on the wheel, N is given one turn, which relieves the pressure on the clamp and permits it to drop by gravity, guided by the slot S. After the clamp has dropped the nut is turned back far enough to hold C taut against the wheel felloe and after this has been done in the case of all the clamps, a slight outward pressure on the rim brings it off the wheel.

Fig. 1—J-M demountable rim in place on an automobile wheel

An illustration of the engagement of the ends of the split ring R2 fitting inside the ring R1 is seen in Fig. 2. When both studs V engage the holes in R2, the two rings form one unit with two flanges accommodating the tire and holding its beads in secure relation. To take the tire off the rim the split ring is removed by prying the end E of R2 off its seating in R1. This is done by inserting the tapered end of the J-M tool between the two rings, on the side of the rim next to the chassis when in place on the car. R2 is made with a depression between which and a flange is formed the recess R referred to above. The depression, which extends all around the ring, fits into an annular groove which is formed on the ring R1. In combination with the two studs and the five clamps, it makes the locking positive. The split ring is replaced on the continuous ring by engaging the stud of the end punched for the tire valve and pushing it into the ring with a foot, the second stud being put in place by a slightly accentuated pressure of the foot. After this the rim is replaced on the wheel, securing all clamps when they are in their lowest position by first loosening the nut which results in the clamp dropping over the recess R, and then tightening it, whereby it is fastened in place.

Mitchell Shock-Absorber

The Mitchell rebound check and shock-absorber, specially constructed for Ford Model T cars by the Mitchell Shock-Absorber Company, Lawrence, Conn. The design resembles that of some other accessories constructed for the same purpose, but the novel idea utilized in the Mitchell device consists in the combination of the coiled spring and strap, as illustrated in Figs. 4 and 5. The former figure shows how the accessory is made for and attached to the front axle of the car. It is composed of two units held together by a horizontal plate, the ends of which are shaped with clamps gripping the lower flange of the I-beam axle. Each unit consists of a base-plate B carrying the coiled spring S1 seated around a projection of the baseplate and bearing against the top plate P mentioned above. Two straps are fastened to the plate B, the shorter one carrying a buckle, while the longer one is laid over the front end of the frame F and is secured to the buckle end of the other strap.

Due to the difference in construction of the two axles, the outfitting for the rear portion of the machine differs from the front axle equipment in several particulars. Reference to Fig. 5 shows the most prominent one, which consists in using a flanged two-piece collar C, the halves of which are held together by bolts, which, when drawn tight in the holes of the collar flanges, hold C positively in place on the rear axle housing. Plate P used in the front axle is eliminated in the rear equipment, while base-plate and straps are also used.

Ford Car License Tag Holder

H. B. Klingensmith, 296 Willow street, Meadville, Pa., has designed a license bracket by means of which the number plate of a Ford car may be attached to the support of one headlight, resulting in a solid engagement of the plate and putting the same in a protected position. The license plate, as secured to lamp support, is seen in Fig. 6, and the detailed construction of the

bracket in Fig. 7, consisting of a casting M, the front portion of which is screw-threaded for two bolts B, while an extension has three holes for bolts C, permitting of fastening a plate P to it. In installing the bracket on the car, the headlight is taken off its support and the bracket is so placed against it that the forks of the support bear in the grooves C. The bracket is held in place by the plate P, the three bolts C being drawn just tight enough to prevent rattling of the bracket on the support. The number plate is then put in place, the bolts B being drawn through the slots in the plate and drawn, by means of their nuts, to the same degree of tightness as the bolts C. After this the headlights are replaced on the supports.

Magnetograph Electric Recorder

As time clocks used for recording the working time in shops are ordinarily subject to a great deal of strain, the Magnetograph, operating by electricity and without a clockwork, is made by the Magneta Company, 1955 Park avenue, New York City. It has absolutely the appearance of an ordinary small time clock of the tabletype, but it is operated by a small electrical odometer mechanism inside, which draws electric current fed to it from a city conduit through a plug. This time-stamp mechanism is regulated through contacts closed every minute by a master clock which comes with the Magnetograph.

Electric Star Headlight

An electric headlight which is vibration proof and very simple in its construction is the Electric Star Headlight, manufactured for the coming season by the Milwaukee Bronze Casting Company, Milwaukee, Wis. The line of this company's products is distinguished by the so-called quick-change feature consisting in the use of a removable reflector hub which represents the base for the electric bulb. The hub carries all the wiring and being practically independent of the reflector body may be used as a trouble-hunting light. It slips into the central opening of the reflector body and is locked there by a slight turn. A turn in the opposite direction unlocks the hub again; the bulb itself is carried in an Edi-Swan socket immune against vibration.

LaMay Chemical Extinguisher

Garage owners should be interested in the new fire extinguisher made and sold by the LaMay Machine Works, Rochester, N. Y., shown in the initial illustration. This device, which is 3 by 14 inches and weighs 5 pounds, is of the conventional cylindrical shape and contains a specially prepared chemical solution under pressure which forces it out of the cylinder through a nozzle, when a red button on the top of the extinguisher is pressed. It is claimed that a stream from 30 to 40 feet in length may be produced by this apparatus, whose capacity for chemical is one quart. The liquid immediately puts out gasoline, kerosene or acetylene fires, according to the maker, and as it is a non-conductor of electricity, it may also be applied where a short-circuit is the cause of an incipient conflagration. Furthermore, the liquid does not injure any fabric. The extinguisher is refilled by unscrewing the head, filling in a quart of Auto-Chemical solution made by the LaMay company and pumping air into the cylinder by a pump attached to it.

Fig. 3—J-M demountable rim, shown off the wheel, illustrating the use of two rings and two-stud scheme

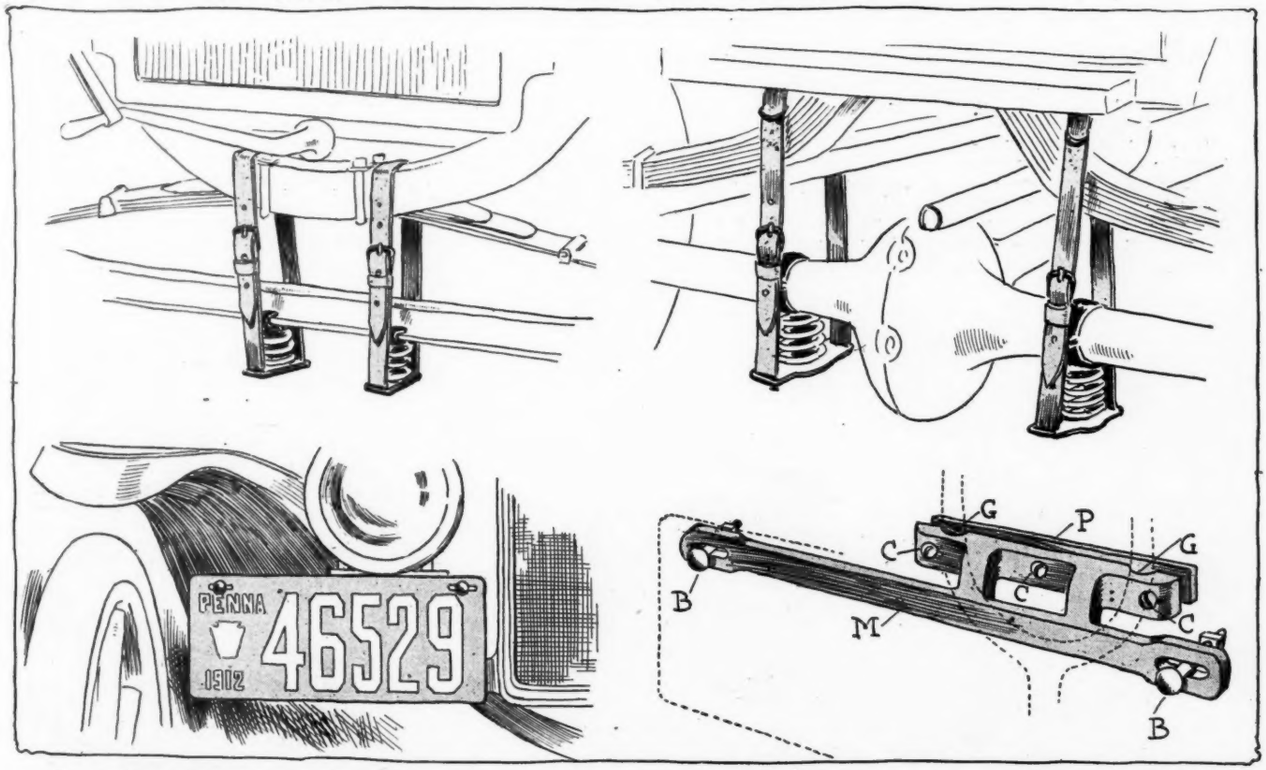


Fig. 4—Mitchell rebound check and shock-absorber applied to Ford model T front axle. Fig. 5—Mitchell shock-absorber design for rear axle unit. Fig. 6—Klingensmith front license-tag holder for Ford model T cars. Fig. 7—Constructional view of Klingensmith license-tag holder

HIGH-Tension Magneto—In which the pole-pieces are formed with an extremity to increase the efficiency of the apparatus.

The subject-matter of this patent, consisting in the peculiar shaping of magneto pole-pieces, is illustrated in Fig. 1. The magneto comprises a magnet M to which pole-pieces P are attached, each of which has one end extended in a direction around the armature A and toward the other pole-piece, so that these extensions E are located diametrically opposite. The inner face of each pole-piece adjacent the extension is formed with a recess R, this design making it possible for the armature to cut the greatest possible number of lines of force twice during every revolution.

No. 1,039,543—to William O. Kinnington, Bloomfield, N. J., assignor to the Simms Magneto Company, Inc., New York City. Granted September 24, 1912; filed October 10, 1911.

Double-Cone Clutch Mechanism—Two male clutch members are mounted on hubs which are pried apart by a wedge.

This patent relates to the clutch construction, Fig. 2, in which the frictional engagement of two cone surfaces C C1 with surfaces F on a driven shaft is kept up by the tension of a spring S connecting their inner centers. Both these surfaces are mounted on the same driving shaft, being slidable thereon by means of hubs H and H1. Each hub is formed with an abutment and between the abutments enters a wedge W carried by a pivoted arm which is connected to a disengaging lever L fitted with a declutching pedal. When the pedal is pressed and the wedge driven in, the latter separates both abutments and the clutch sections to which they are engaged, against the tension of the spring S, effecting disengagement of the clutch sections.

No. 1,039,495—to Paul Daimler, Stuttgart, Germany, assignor to Daimler Motoren-Gesellschaft, Untertuerkheim, Germany. Granted September 24, 1912; filed September 16, 1911.

Internal-Combustion Motor—A two-cylinder design in which two reciprocating and one rotating crankpin is used.

The engine referred to in this patent comprises cylinders cast in pairs, the pistons of which have connecting-rods being on a driving connection D having two bearings R for the ends of the connecting-rods and one C serving as a crankpin, being set eccentrically with reference to the crankshaft S. The piece D is fulcrumed at F to a connection C1 which has one end fixed at the side of the crankcase. In the operation of the motor the crankpin C revolves around the crankshaft S, while the point F reciprocates vertically, remaining always higher than C. The ends of the connecting-rods alternately ascend and descend.

No. 1,039,493—to Elmer L. Courtwright, Tacoma, Wash. Granted September 24, 1912; filed December 20, 1911.

Shock-Absorber for Automobiles—Comprising resilient friction surfaces pressed against the periphery of a container.

This patent refers to a shock-absorber consisting of a casing lined on its inside periphery with a friction surface against which bear friction members or shoes F which normally do not

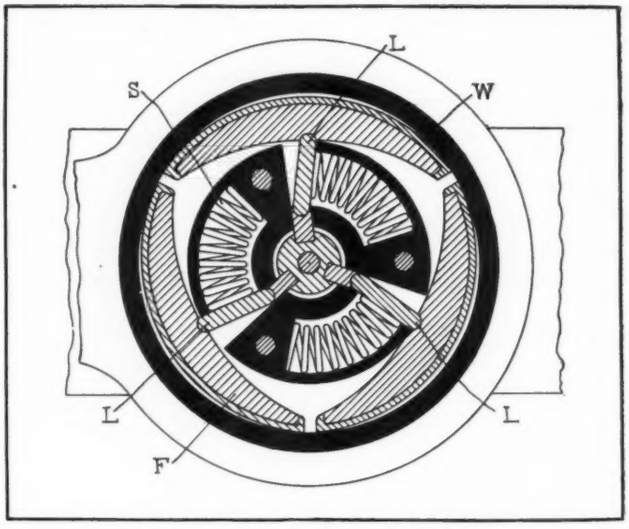


Fig. 4—Martin friction shock-absorber

conform in shape to the wall of the casing. Links L are so connected to the friction members that if they are turned around their central fulcrum, they press the shoes against the wall of the casing, if turned in one direction, or are resisted by the compression of springs S interposed between them (the links) if turned in the other direction.

No. 1,039,305—to George Cushing Martin, Los Angeles, Cal. Granted September 24, 1912; filed September 11, 1911.

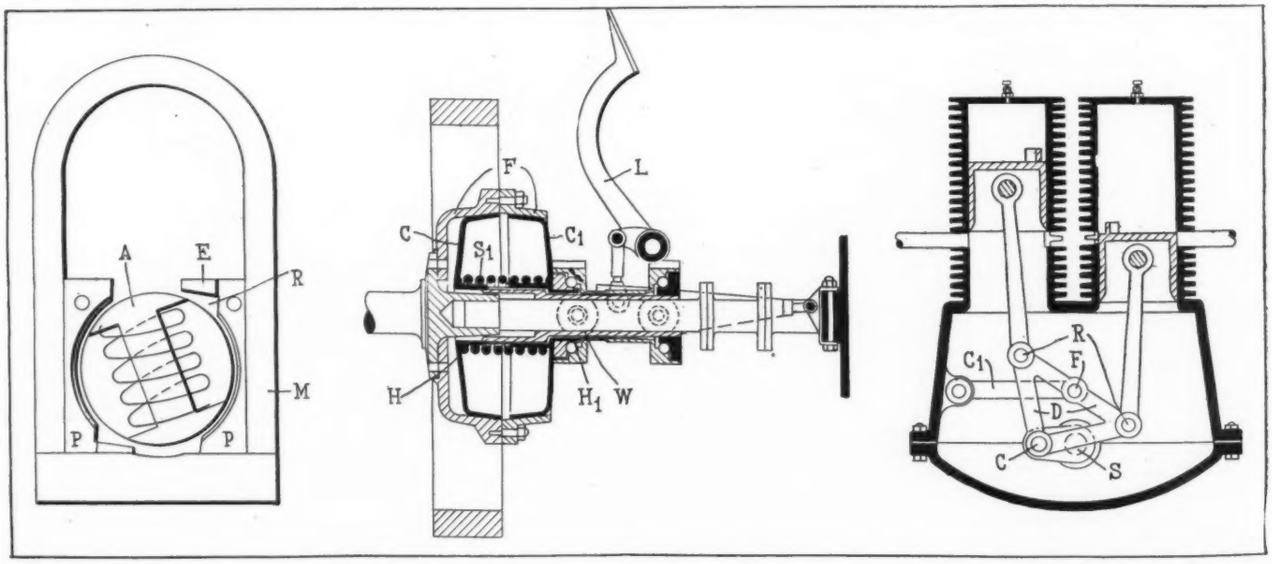


Fig. 1—Kinnington-Simms high-tension magneto. Fig. 2—Daimler double-cone clutch. Fig. 3—Courtwright twin-cylinder motor